

NATIONAL GEOGRAPHIC

why we love

caffeine



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THE COVER

A tempting cup of cappuccino beckons a caffeinated world.

BY BOB SACHA

♻️ Cover printed on recycled-content paper

ON THE WEBSITE

nationalgeographic.com/magazine

SIGHTS & SOUNDS Stay up on caffeine with Bob Sacha.

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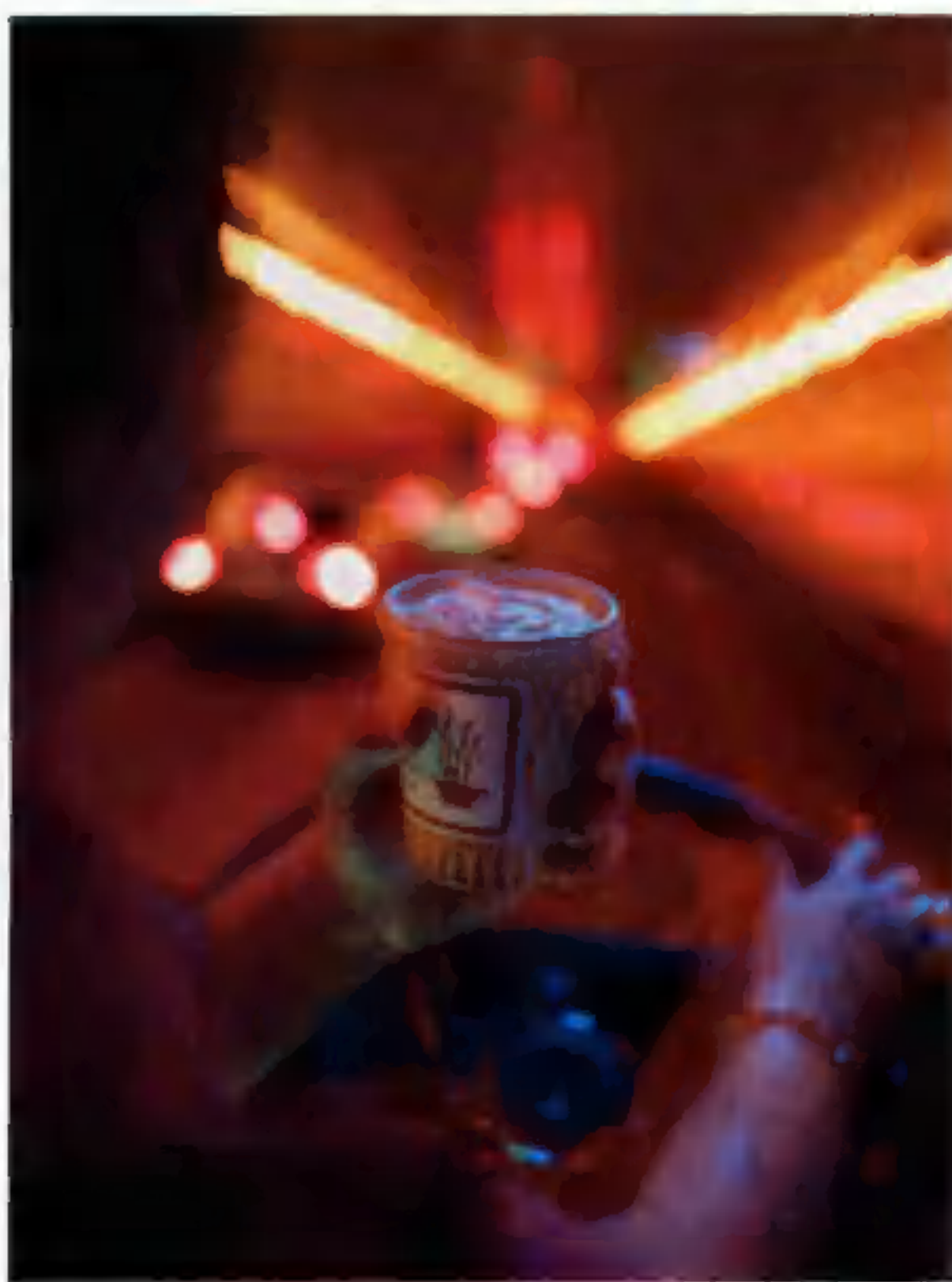
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WALLPAPER Decorate your desktop with mama cheetahs.

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From the Editor



GREGORY HEISLER

Most of us don't think of our cup of coffee, tea, or even some soft drinks as a drug delivery system. They've become such a part of our social rituals that we hardly notice their pervasive—and often contradictory—role in our lives. Want to speed up? Down a few cups of coffee and get to work. Want to slow down? Have a cup of tea with friends and relax.

But drug delivery systems are precisely what these drinks are. It's no coincidence that many of the world's favorite beverages contain the same active ingredient: caffeine, the most popular mood-altering—and habit-forming—drug on the planet.

If you think you don't do caffeine, think again. Decaffeinated coffees and teas still contain a small dose of caffeine. Some brands of orange soda have as much caffeine as colas. Having a little dessert? Dark chocolate delivers a fairly sizable jolt of caffeine, and those coffee-flavored yogurts and ice creams do too. Feeling a little tight in your dress or trousers because of that dessert? Many weight-control pills have caffeine.

I've always wondered about caffeine's effects on our health and its place in cultural rituals around the world. So I sent writer T. R. Reid and photographer Bob Sacha to find out what the buzz is all about. I'm betting that their story will perk up your day.

Bill Allen

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Rockhopper Penguin (*Eudyptes chrysocome*)

Size: Length, 52-55 cm **Weight:** 2.5 -3.0 kg

Habitat: Tussocks of high grass in temperate, rocky areas; winter months are spent at sea

Surviving number: Estimated at 3.67 million pairs



Photographed by Ira Block

WILDLIFE AS CANON SEES IT

Good grooming pays. Behold the rockhopper penguin, which spends a great deal of time making sure every feather is just so. Appearance counts when courting a mate: the male shakes its head and its yellow eyebrows fly into an eye-catching "halo." Once paired up, grooming becomes an important social bond between the monogamous couple. But grooming really pays off by keeping the penguin's coat waterproof, a prerequisite for

spending the winter months combing the sea for squid, krill and other crustaceans. This bird covers a wide area, and faces a wide range of threats: from predators and egg poaching to commercial fishing and pollution.

As an active, committed global corporation, we join worldwide efforts to promote awareness of endangered species. Just one way we are working to make the world a better place—today and tomorrow.

OnScreen & Online



NATIONAL GEOGRAPHIC
CHANNEL

PREMIERES SUNDAY, JANUARY 9, 8 P.M. ET/PT

Explorer Moves to NGC

Beginning this month the Emmy award-winning documentary series brings its fresh mix of adventure, science, and natural history programs to the National Geographic Channel, the Society's fast-growing, four-year-old network. Lisa Ling returns as host when *Explorer* launches its new season on NGC with unforgettable insights into the lives of humans and animals.

■ **FEMALE SUICIDE BOMBERS** have emerged as the latest deadly weapon for terrorist groups around the world, from Israel to Chechnya. Join host Lisa Ling as she investigates the complicated reasons women, many of them still in their teens, take on the mantle of terrorism.

■ **SPIDERS' LETHAL LIAISONS** are the quarry of scientist Ana Rivero in this riveting episode. Ride along with Ana on a road trip to the darkest corners of Spain, and learn about ardent arachnids, such as wolf spiders, tarantulas, and black widows (right), whose attractions can be fatal.



SUNDAY, JAN. 16

9 P.M. ET/PT

Predators at War

It's every animal for itself when drought overwhelms the Mala Mala Game Reserve in South Africa. With water and food scarce, traditional behavior



patterns collapse. Watch as fierce clashes break out between predators—hyenas, leopards, wild dogs, and lions. Amazing footage captures these animals as they battle for dwindling resources and survival.

Find out what's on and how to get the Channel in your area at nationalgeographic.com/channel. Programming information is accurate at press time. Consult local listings.

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NEW SEASON PREMIERES FRIDAY, JANUARY 7, 8 P.M. ET/PT

Be the Creature

Travel into the wild with the irrepressible naturalist brothers Chris and Martin Kratt as they try to see the world from an animal's-eye view. Toting little more than survival gear and cameras, the Kratts hunt, play, and rest with their formidable subjects—from Komodo dragons in Indonesia to cheetahs in the Serengeti. Their goal: Be the creature.

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BEST PICTURES OF 2004

Preview the collector's edition, decorate your desktop with the issue's images, and follow links to 2004 online exclusives. Find contest rules and register to win a cruise to Antarctica. nationalgeographic.com/magazine/pictures2004



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Behind the Scenes



WORLD AFFAIRS

Making a Difference

Eduardo Condor Ramos was walking his sheep along a mountain road when a taxi mowed down six of the animals—and kept going. Photographer Bill Allard captured the Peruvian boy's anguish in the moments after the accident. When the image (above) ran in our March 1982 issue, it moved readers to send donations that not only replaced the sheep but also helped fund local schools. GEOGRAPHIC articles have often inspired members. Our March 2002 story on the Attwater's prairie-chicken motivated members to support a captive-breeding program and restoration of the birds' Texas habitat. A Washington State couple tracked down Svetlana Gasparian—a young widow mentioned in our March 2004 Armenia article who was about to be evicted—and sent her money. Photographer Stephen Ferry wrote from Colombia to say that within days of the October 2004 issue's appearance on newsstands, native peoples featured in his story in that issue had already received offers to help buy their land back from developers. Copies of our September 2004 issue (right) were requested by U.S. Senators John McCain and Joseph Lieberman—sponsors of the Climate Stewardship Act—to inform their Capitol Hill colleagues. That magazine also helped one Maryland reader decide what to do with her life. Wondering whether to accept a job "totally unrelated to my interests" or to pursue graduate work dealing with climate change, she found that Editor Bill Allen's column "was all the inspiration I needed." The job can wait. Learn more at nationalgeographic.com/magazine/0501.



ITALY BEFORE THE ROMANS (PAGE 52)

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Calendar

JANUARY

9 Explorer comes to the National Geographic Channel. Premieres Sunday at 8 p.m. ET/PT.

FEBRUARY

8 Robert D. Ballard lectures on his book *Titanic Revisited* at the Field Museum's James Simpson Theatre in Chicago, Ill. For tickets, call 312-665-7400.

23 Inside Secret Worlds

NATIONAL GEOGRAPHIC photographer Jodi Cobb talks about shooting her stories on beauty, Japan's geishas, modern slavery, and more at Benaroya Hall in Seattle, Wash. Call 206-624-5677 for Seattle tickets. Cobb also lectures at the Field Museum's James Simpson Theatre in Chicago on March 22.

28 Crane Cam returns. Check nationalgeographic.com/magazine for information on real-time coverage of the sand-hill crane migration. Video tutorials and lesson plans for teachers are also available on the website.

MARCH

10 Børge Ousland lectures on his solo polar expedition at the State Theatre in Minneapolis, Minn. Call 866-880-9577 for Minneapolis tickets. Ousland also lectures on his Patagonia ice cap expedition at Benaroya Hall in Seattle on March 15.

Calendar dates are accurate at press time; please go to nationalgeographic.com or call 1-800-NGS-LINE (647-5463) for more information.

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EXPLORER

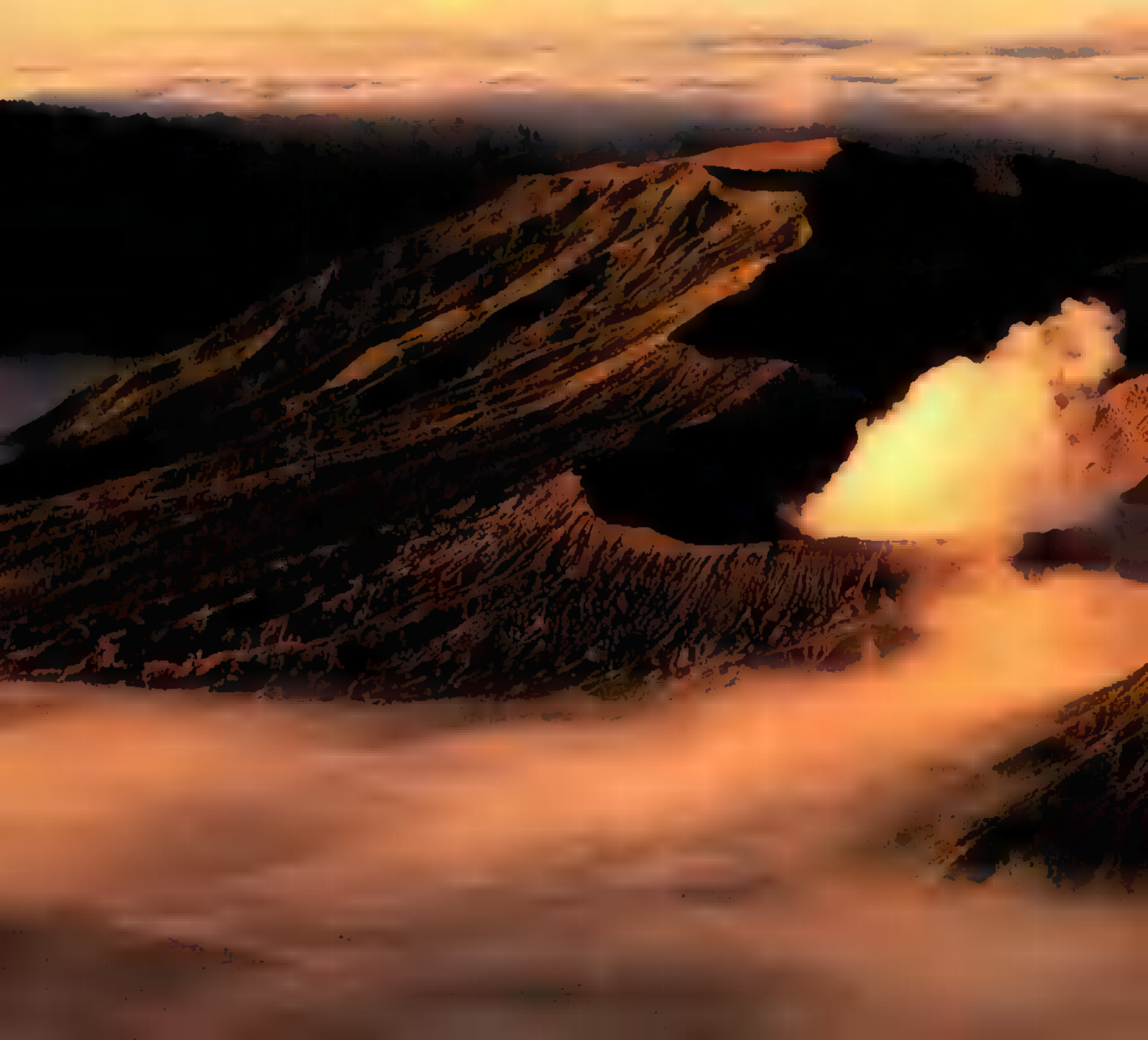
Built for the road ahead.

Visions of Earth

EAST JAVA, INDONESIA

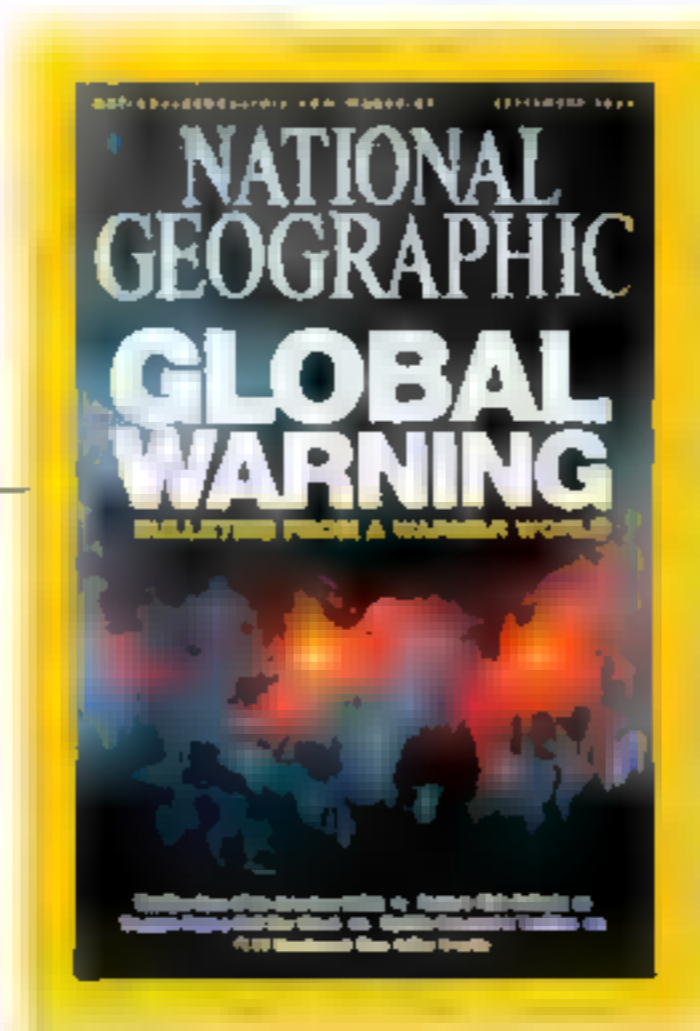
There was nothing earthly about the windswept scene I saw as sunrise slowly revealed the towering cone of Semeru, background, Java's highest mountain, and its smaller neighbor Mount Bromo, below. Indonesian Hindus consider Bromo a holy mountain, and they leave offerings there to appease the gods. A temple nestled under the cloud cover on Bromo's flank was the only suggestion that this place was anything but primeval. —*Dan Brooks*

► Decorate your desktop with this image from East Java at nationalgeographic.com/magazine/0501.





Forum



September 2004

The "Global Warning" package generated an overwhelming number of passionate responses. Two other stories on the environment over the past year, "The End of Cheap Oil" and "Case of the Missing Carbon," also inspired readers to write. Many were grateful for our extensive coverage of global warming. Others were outraged by the "Global Warning" stories, believing them to be political rather than scientific.

Global Warning

Congratulations on your recent issue devoted to global warming. The quality of your discussion of this critical subject was superb. The world has moved beyond a debate about whether action to reduce the threat of global warming is required and now thirsts for knowledge about the nature of this problem and how best to address it. This NATIONAL GEOGRAPHIC delivers on both counts. True to your tradition, this issue and others like it will be valued by all Americans, regardless of age, political persuasion, or level of knowledge, for years to come.

STEWART HUDSON
Meriden, Connecticut

Please don't do politics. Of course it's getting warmer, but when the Earth cools again—and it will—you'll look very

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For an online index of all National Geographic publications, go to: nationalgeographic.com/publications

foolish blaming that on man too.

MARK BENNETT
Bellingham, Washington

Most readers, including educators, need the scientific clarity you brought to the subject of climate change. I am fearful that we live in an environment where some treat science as though it is politics. There are not two sides to science. Rather science is about understanding what is happening and why.

JANET K. POLEY
Lincoln, Nebraska

While I applaud your efforts, I can't help thinking that you are preaching to the converted. Surely, only governments can hope to slow or halt this headlong rush to Armageddon by working together. I would like to see copies of your September issue sent to every world leader, every UN representative, every congressman, and all captains of industry (particularly the major polluters) with a simple question appended: What are you going to do about it?

FRANK HOLLOWAY
Biggleswade, Bedfordshire

Global warming is a symptom, not a cause. Attempting to curb



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FOOD AND FAMILY.
The 2 sources of cholesterol.



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You probably know that cholesterol comes from food. But what you might not know is that your cholesterol has a lot to do with your family history.

VYTORIN treats both sources of cholesterol. When diet and exercise aren't enough, adding VYTORIN can help.

VYTORIN helps block the absorption of cholesterol that comes from food *and* reduces the cholesterol that your body makes naturally. And VYTORIN can dramatically lower your bad cholesterol 45%–60%.

(Average effect depending on dose. 52% at the usual starting dose.)

Ask your doctor about VYTORIN.

Important information: VYTORIN is a prescription tablet and isn't right for everyone, including women who are nursing or pregnant or who may become pregnant, and anyone with liver problems. Unexplained muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. VYTORIN may interact with other medicines or certain foods, increasing your risk of getting this serious side effect. So, tell your doctor about any other medications you are taking.

To learn more, call
1-877-VYTORIN or visit vytorin.com

Please read the Patient Product
Information on the adjacent page.



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VYTORIN
(ezetimibe/simvastatin)

Treat the 2 sources of cholesterol.

VYTORIN™ (ezetimibe/simvastatin) Tablets

Patient Information about VYTORIN (VI-tor-in)

Generic name: ezetimibe/simvastatin tablets

Read this information carefully before you start taking VYTORIN. Review this information each time you refill your prescription for VYTORIN as there may be new information. This information does not take the place of talking with your doctor about your medical condition or your treatment. If you have any questions about VYTORIN, ask your doctor. Only your doctor can determine if VYTORIN is right for you.

What is VYTORIN?

VYTORIN is a medicine used to lower levels of total cholesterol, LDL (bad) cholesterol, and fatty substances called triglycerides in the blood. In addition, VYTORIN raises levels of HDL (good) cholesterol. It is used for patients who cannot control their cholesterol levels by diet alone. You should stay on a cholesterol-lowering diet while taking this medicine.

VYTORIN works to reduce your cholesterol in two ways. It reduces the cholesterol absorbed in your digestive tract, as well as the cholesterol your body makes by itself. VYTORIN does not help you lose weight.

Who should not take VYTORIN?

Do not take VYTORIN:

- If you are allergic to ezetimibe or simvastatin, the active ingredients in VYTORIN, or to the inactive ingredients. For a list of inactive ingredients, see the "Inactive ingredients" section at the end of this information sheet.
- If you have active liver disease or repeated blood tests indicating possible liver problems.
- If you are pregnant, or think you may be pregnant, or planning to become pregnant or breast-feeding.

VYTORIN is not recommended for use in children under 10 years of age.

What should I tell my doctor before and while taking VYTORIN?

Tell your doctor right away if you experience unexplained muscle pain, tenderness, or weakness. This is because on rare occasions, muscle problems can be serious, including muscle breakdown resulting in kidney damage.

The risk of muscle breakdown is greater at higher doses of VYTORIN.

The risk of muscle breakdown is greater in patients with kidney problems.

Taking VYTORIN with certain substances can increase the risk of muscle problems. It is particularly important to tell your doctor if you are taking any of the following:

- cyclosporine

- antifungal agents (such as itraconazole or ketoconazole)
- fibric acid derivatives (such as gemfibrozil, bezafibrate, or fenofibrate)
- the antibiotics erythromycin and clarithromycin
- HIV protease inhibitors (such as indinavir, nelfinavir, ritonavir, and saquinavir)
- the antidepressant nefazodone
- amiodarone (a drug used to treat an irregular heartbeat)
- verapamil (a drug used to treat high blood pressure, chest pain associated with heart disease, or other heart conditions)
- large doses (≥ 1 g/day) of niacin or nicotinic acid
- large quantities of grapefruit juice (>1 quart daily)

It is also important to tell your doctor if you are taking coumarin anticoagulants (drugs that prevent blood clots, such as warfarin).

Tell your doctor about any prescription and nonprescription medicines you are taking or plan to take, including natural or herbal remedies.

Tell your doctor about all your medical conditions including allergies.

Tell your doctor if you:

- drink substantial quantities of alcohol or ever had liver problems. VYTORIN may not be right for you.
- are pregnant or plan to become pregnant. Do not use VYTORIN if you are pregnant, trying to become pregnant or suspect that you are pregnant. If you become pregnant while taking VYTORIN, stop taking it and contact your doctor immediately.
- are breast-feeding. Do not use VYTORIN if you are breast-feeding.

Tell other doctors prescribing a new medication that you are taking VYTORIN.

How should I take VYTORIN?

- Take VYTORIN once a day, in the evening, with or without food.
- Try to take VYTORIN as prescribed. If you miss a dose, do not take an extra dose. Just resume your usual schedule.
- Continue to follow a cholesterol-lowering diet while taking VYTORIN. Ask your doctor if you need diet information.
- Keep taking VYTORIN unless your doctor tells you to stop. If you stop taking VYTORIN, your cholesterol may rise again.

What should I do in case of an overdose?

Contact your doctor immediately.

What are the possible side effects of VYTORIN?

See your doctor regularly to check your cholesterol level and to check for side effects. Your doctor may do blood tests to check your liver before you start taking VYTORIN and during treatment.

In clinical studies patients reported the following common side effects while taking VYTORIN: headache and muscle pain (see What should I tell my doctor before and while taking VYTORIN?).

The following side effects have been reported in general use with either ezetimibe or simvastatin tablets (tablets that contain the active ingredients of VYTORIN):

- allergic reactions including swelling of the face, lips, tongue, and/or throat that may cause difficulty in breathing or swallowing (which may require treatment right away), and rash; inflammation of the pancreas; nausea; gallstones; inflammation of the gallbladder.

Tell your doctor if you are having these or any other medical problems while on VYTORIN. This is not a complete list of side effects. For a complete list, ask your doctor or pharmacist.

General Information about VYTORIN

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use VYTORIN for a condition for which it was not prescribed. Do not give VYTORIN to other people, even if they have the same condition you have. It may harm them.

This summarizes the most important information about VYTORIN. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about VYTORIN that is written for health professionals. For additional information, visit the following web site: vytorin.com.

Inactive ingredients:

Butylated hydroxyanisole NF, citric acid monohydrate USP, croscarmellose sodium NF, hydroxypropyl methylcellulose USP, lactose monohydrate NF, magnesium stearate NF, microcrystalline cellulose NF, and propyl gallate NF.

Issued July 2004



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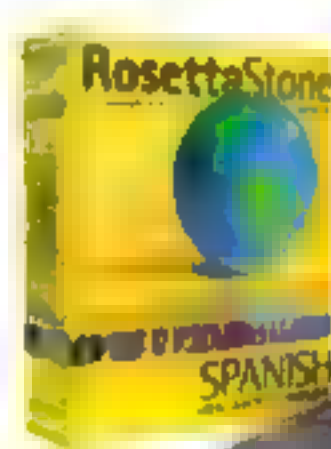
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Texas, USA

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From the Editor

Thank you for writing the best column you've ever written. Few people know what it means to wear their heart on their sleeve and even fewer are brave enough to do it. Thank you for standing behind your words and your work.

BARBARA POUNDER
Royal Oak, Michigan

After the September issue, I am forced reluctantly to cancel my membership. When Mr. Allen mentioned that he has been editor in chief for a decade, I thought, Yes, ten years ago is about when I started to notice a bias. A one-degree increase in atmospheric temperature over a century barely qualifies as a data point, certainly not a trend!

TED M. WATSON
South Colby, Washington



I wish to extend my deep appreciation to Bill Allen for his defense of the global warming series. It is because of this kind of integrity that many of us subscribe. We want the truth about what has happened, is happening, and could happen to our planet, not the politicized version that

insists all is well when we know darn well it isn't.
RODGER LEWIS
Crawfordville, Florida

I have to agree with Bill Allen's comment that "a lot of angry letters" will be forthcoming. Here's mine. For eons there's been years of ice age followed by years of global warming. Why do we as a society have to try to change what has occurred for millennia?
HARRY M. PIPE, JR.
Tool, Texas

I admire your courage, wisdom, and determination. My check for \$500 is to cover a few of the subscription cancellations by people who are too shortsighted to see beyond their own gain.
KIMIE GILBERTSON
Honolulu, Hawaii

greenhouse gas emissions without a sound plan to reduce the human population is like treating someone with typhoid fever with aspirin: The fever may go down awhile, but the patient dies.
THOMAS A. ROLL
Cincinnati, Ohio

I live in the highlands of Scotland, where the once bustling ski resorts in the Cairngorm Mountains struggle because winter snows no longer fall as they did decades ago and peaks that were once snow-covered

year-round are now bare about four months in summer. Scientists say melting Arctic ice may cause the Gulf Stream to be cut off from northern Europe, which could have disastrous consequences for our climate.
JOHN MOIR
Forres, Moray

In a world where competing claims, complex subject matter, and intense debate make it difficult to understand the implications of phenomena such as climate change, we need such in-depth reviews. NATIONAL GEOGRAPHIC has, once again, proved its value as a source of independent analysis and well-documented information.
ACHIM STEINER
Director General
IUCN-The World Conservation Union
Gland, Switzerland

Indian Renaissance
I found the articles on global warming and the American Indian renaissance complementary. The worldview of American Indians can teach us how to take only what we need and give back what we can. American Indian cultures have survived despite our best efforts to squash them, and we have much to learn from them. Adopting something as simple as thinking of the seventh generation would help everyone from policymakers to homemakers create a sustainable world.
STEPHEN W. GURTOWSKI
Norwood, Massachusetts

For surviving more than five centuries of genocidal exploitation, American Indians deserve all the admiration and support they can get. But, as usual, the United States government's

WRITE TO FORUM National Geographic Magazine, PO Box 98199, Washington, DC 20090-8199, or by fax to 202-828-5460, or via the Internet to ngsforum@nationalgeographic.com. Include name, address, and daytime telephone. Letters may be edited for clarity and length.



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policies are erratic at best, often hollow if not blatantly deceitful. The 1978 American Indian Religious Freedom Act is purely rhetorical: It has no enforcement provisions. So it really is not an "act" at all; it's feel-good window dressing for members of Congress and the public but has no legal value for Indian nations trying to protect their sacred sites, which continue to be under assault from both corporations and governments.

JOE MORTON
Towson, Maryland

I was surprised that you decided to use the term "Indians" to describe the groups that first populated our continent. There are many names from which you could have chosen: First Nations, Natives, American

Aboriginal peoples. Anything is better than Indian. Indians are people from India. Never mind being politically correct, what about geographic and historical accuracy? It's ridiculous that an entire population continues to be mislabeled by a 15th-century mistake.

KATHRYN JOSAFATOW
Robson, British Columbia

There is no consensus on terminology in native communities. Our choice to use both "Native American" and "Indian" throughout the article reflects differing usage across the cultures.

Thank you so much for your enlightening article on the Native American renaissance. It is very refreshing over here to hear positive news about a

people we know only from old Westerns and comic books.

BILL EASTER
Cambridge, Cambridgeshire

Treasure Ship

Congratulations on a stunningly illustrated article. NATIONAL GEOGRAPHIC has brought the S.S. *Republic*, a ship most of us never heard of, to our day and consciousness. Priit Vesilind captured the drama, not only of *Republic's* fateful voyage but also of the archaeological crew's efforts and technological know-how.

FRANCIS N. ALLEN
Hyattsville, Maryland

As graduate students in the maritime archaeology discipline, we were very excited to see an article on a shipwreck that is part

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In 1922, a small watchmaker in Switzerland designed the first automatic watch to display the day, month and date. These watches were among the most stylish of the roaring 20's. The Stauer watch design that you see here has the antique color, the vintage style and the innovative functions of the original that we have seen in a Swiss museum. Even the Breguet™ style hands are designed from the original.

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of our American heritage. Yet we were astounded by what we read. The maritime archaeology community has been working for decades to stop commercial salvage companies from destroying shipwrecks for gain. The breaking up of archaeological collections and selling of artifacts is prohibited on archaeological sites around the globe, but for some reason, if the same sites are underwater, these rules do not apply. It is clear from reading the article that the objective was to collect coins. These artifacts will soon be sold to private collectors, and it will be impossible to study the collection as a whole. This project was about looting for profit, plain and simple.

BRAD GARRETT
ERIKA STEIN
Townsville, Queensland

Although Odyssey Marine Exploration, the salvage company that discovered the Republic, will sell the artifacts, it performed an excavation that was legal, safe, and professional. And, as its marine archaeologist says in the story, only a commercial operation could afford such an expensive deep-sea recovery.

Geographica: Anasazi Rope

I enjoyed the article on the possible use of ropes by the Anasazi to reach some of their dwellings. Field-testing of ancient tools is an interesting approach to expanding our knowledge of cultures and long-lost skills. As an engineer, however, I can't help but wonder about the rope-strength tests. If a single rope was not strong enough to support a human with complete

confidence, then wouldn't the cliff dwellers have used more than one rope?

JOHN B. ROLLINS
Southlake, Texas

Maybe they did, but the climbers who tested the rope believe the Anasazi probably used the three-eighths-inch yucca cord as a handrail to guide cliff dwellers up hand-and-toe trails or as a static line to help less sure-footed travelers—not as a climbing rope strong enough to stop a fall without breaking.

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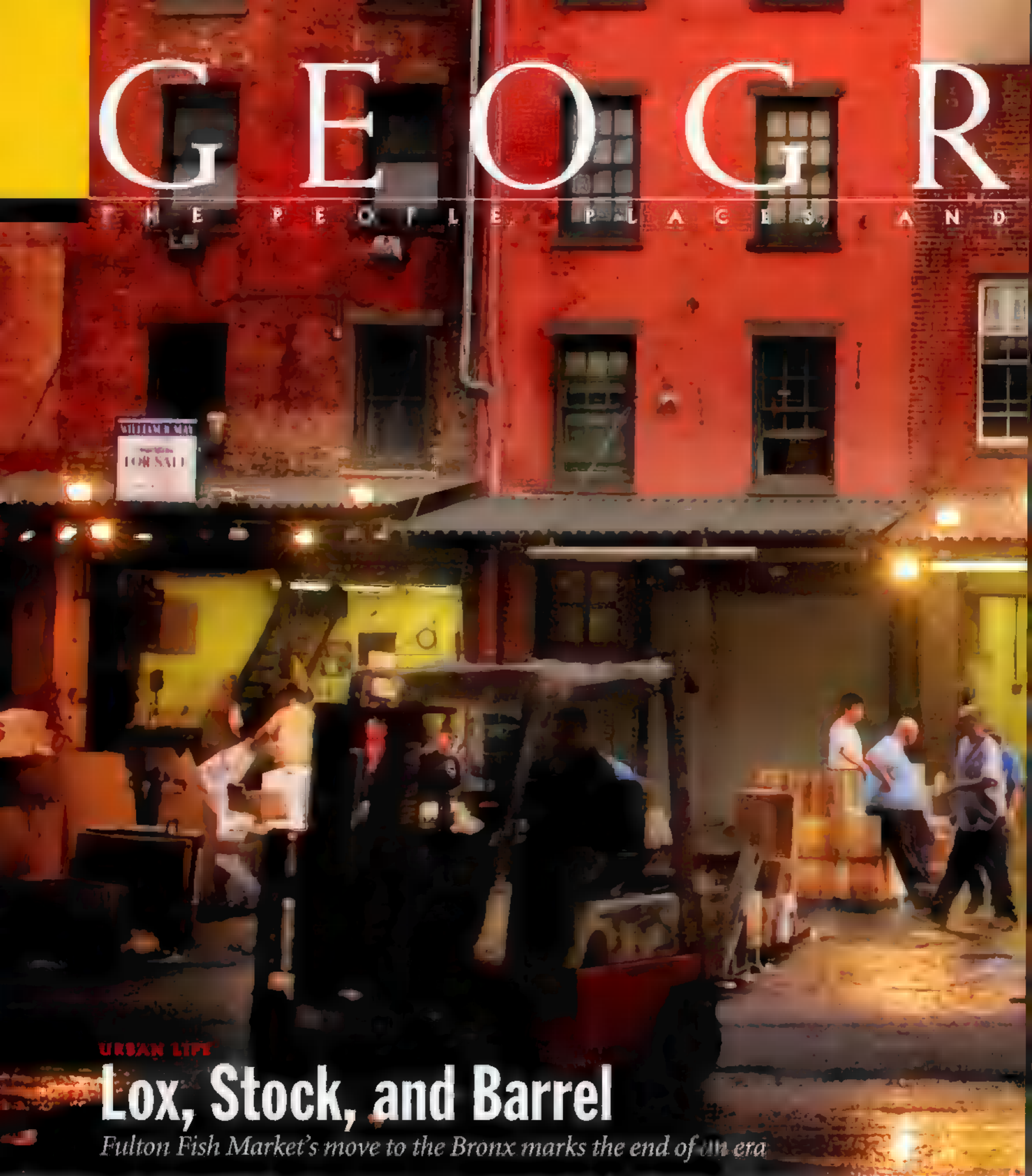
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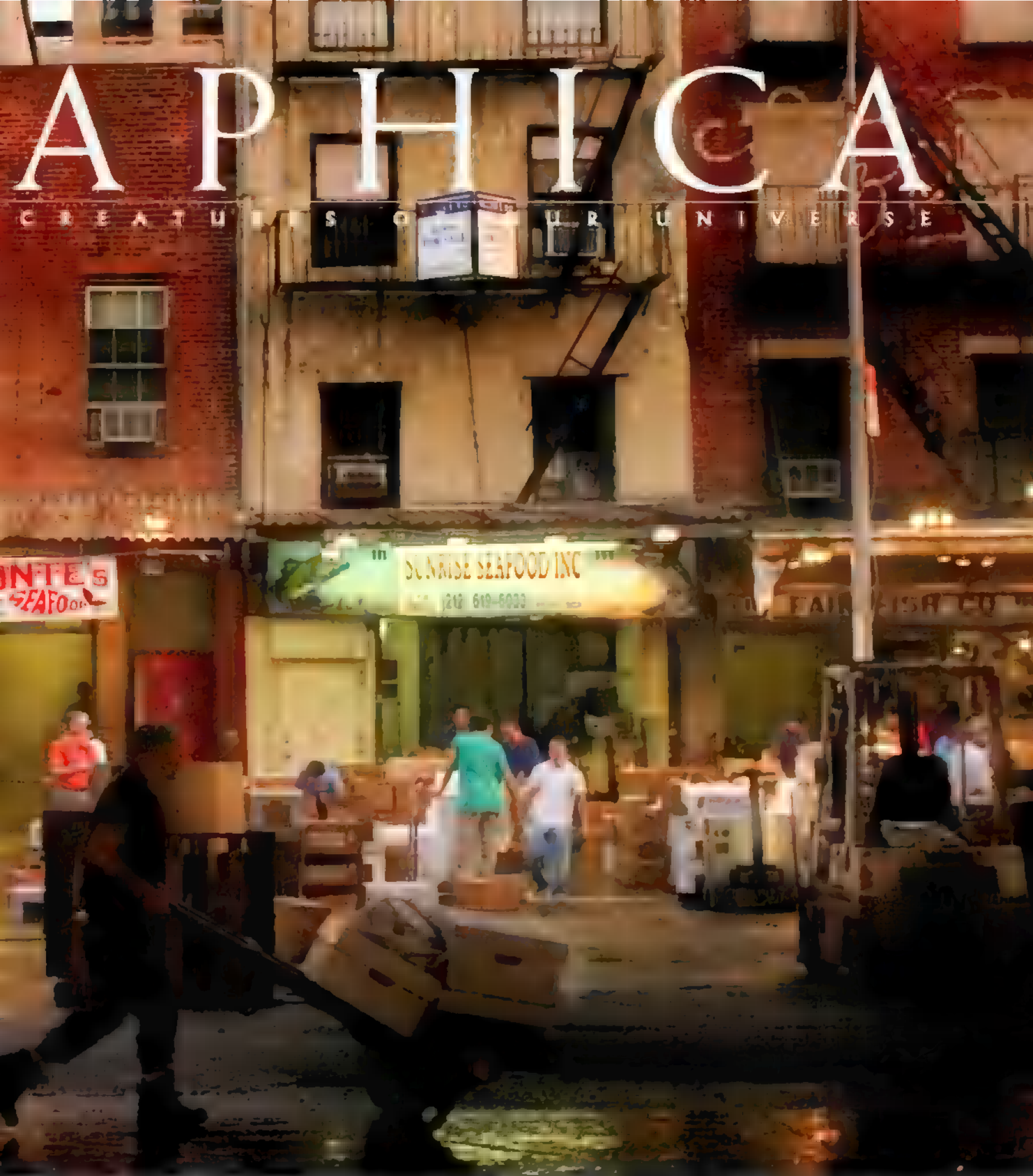
Fulton Fish Market's move to the Bronx marks the end of an era

Like a scene out of an old movie, a predawn morning at New York City's Fulton Fish Market is a glimpse into a grittier time—when cities leaned heavily on waterfront businesses and on the tough guys who toiled there. As former market worker Jack Putnam puts it, “This place runs on testosterone,

caffeine, and nicotine.” But all that old-school attitude can't keep modernization away. After nearly 200 years at the same spot on Manhattan's southeastern waterfront, Fulton Fish Market is moving this month from cobblestone streets in the shadow of skyscrapers to a state-of-the-art facility in the Bronx.

“I don't want to move,” says Dino Fiorentino, one of about 45 wholesalers occupying the market's brick storefronts and open stalls (above). But many other vendors here have adopted an attitude of “what's good for the market is good for me.”

The market's new 430,000-square-foot structure is right off



BOB SACHA

the Bruckner and Sheridan Expressways and offers conveniences like truck-docking bays and refrigeration systems that will comply with federal food-safety standards. Fulton Fish Market is “going from the 19th to the 21st century in one shot,” says Jeff Manzer of the New York City Economic Development

Corporation, which is overseeing the relocation.

But with this jump into the future, New York is losing some of its past. The fish sellers have been here since 1822, when the city opened a collection of stalls hawking food and merchandise to crowds traveling between Brooklyn and Manhattan via the

nearby Fulton Ferry. The seafood business grew fast, and by 1831 the fish merchants had moved into their own building. By 1848 the fish market near Fulton Ferry had become the Fulton Fish Market—so big and popular that it continued to expand even when its neighboring food vendors moved across town.



NAT FEIN (ABOVE); BOB SACHA (ALL RIGHT)

Some things haven't changed much over the years. Two South Street buildings still extend right over the river, a vestige of the time when a day's catch was stored directly in the water. But a row of old storefronts lining the street's west side has already become part the South Street Seaport district's outdoor mall.

"It's something we need to do," says seafood wholesaler Anthony Grippa of the move. The city of New York had been trying to convince the fishmongers of that since the 1960s. It finally took a confluence of flagging business, stricter food-industry regulations, and the political will of former mayor Rudolph Giuliani—who had been instrumental in cleaning organized crime out of the market in the 1980s and '90s—to get the ball rolling.

It also took a hard look at reality.

Fulton Fish Market had run into that roadblock known as progress. Just like Paris's famed Les Halles—which was relocated to a suburban facility with much more space and much less charm—the Manhattan landmark had become an anachronism. Its location was unnecessary: The last regular boat delivery of fish to its East River pier occurred in 1979. These days refrigerated trucks

transport the seafood. Of course, its throwback status has been a part of the market's appeal. But, as Arrow Seafood's owner Bob Smith says, "I don't do it for the nostalgia. I do it for the money." Location is of vital importance to the market's businessmen. "If you're a hundred feet from the center of activity, you're not in it," Smith notes. "You have to be where the truck terminus is."

Now that's where the Fulton Fish Market will be. And the only reminder of its history in lower Manhattan may be the smell of two centuries of seafood suffused into pavement and brick. Who knows how long that legacy will last.

—Billie Cohen

Fish Markets of the World

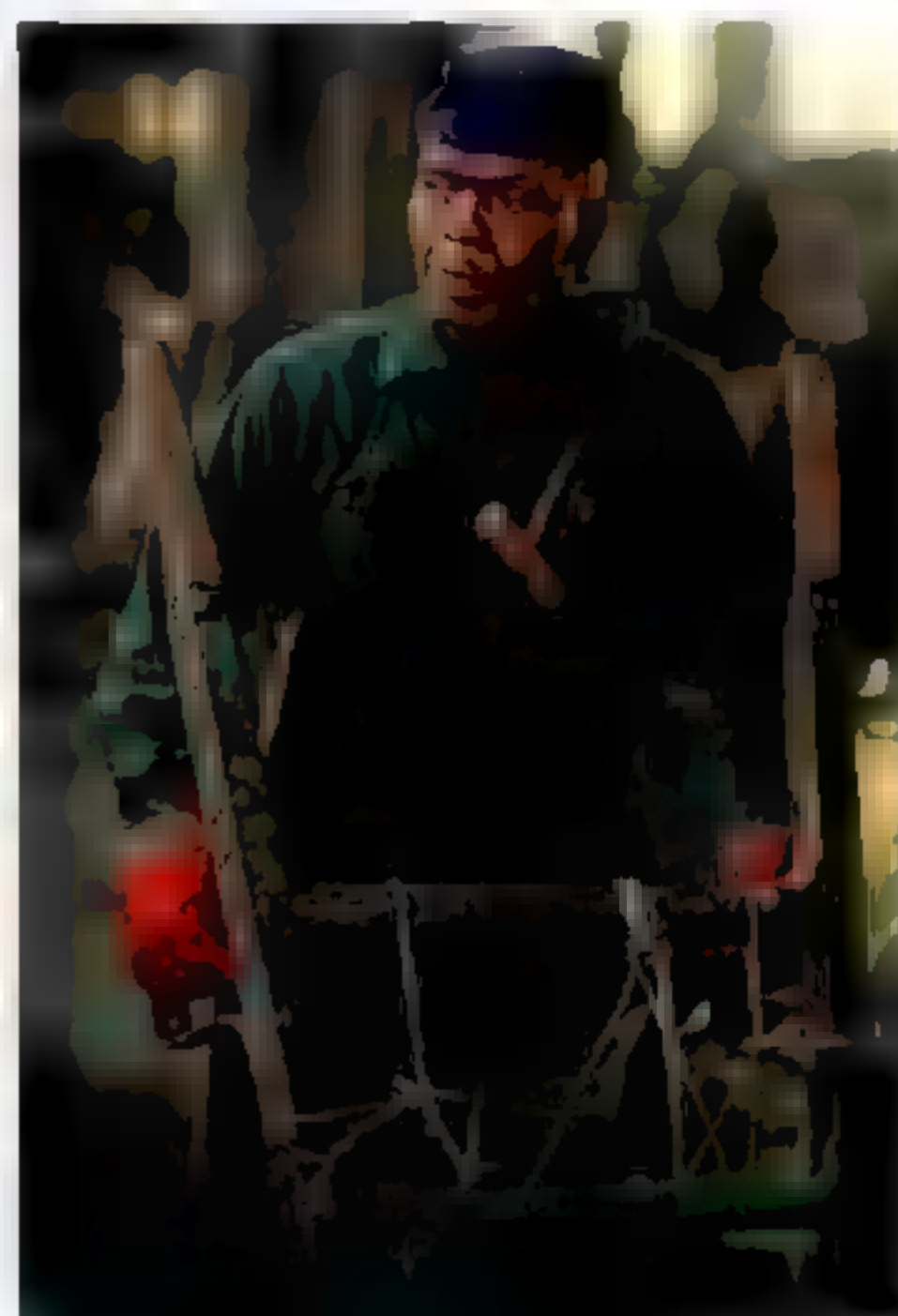
Tsukiji fish market in Tokyo is the world's largest, handling more than 2,000 tons of 450 types of seafood daily.

Billingsgate in London was declared by Parliament in 1699 to be "a free and open market for all sorts of fish whatsoever." It still does a thriving business.

Sydney Fish Market in Australia has a working port and a seafood cooking school in addition to wholesale and retail operations.



Glenn Kaggen is a third-generation market worker. He worries: "Some retail customers might not want to switch to the new location."



Raymond Gilyard has spent 33 years at the market but isn't ready to quit—yet. "I'll go to the Bronx and retire later," he says.



Adrian Feliciano has a job at Carl's Seafood. "I think it's a shame," says the 19-year-old of the market's move to the Bronx.



Production line at Toyota's Georgetown, KY manufacturing plant, where the Avalon, Camry and Solara are built.

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MEGAFLYOVER

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Hippos 150, hippos 250, hippos 300. I'm frantically tallying on my computer as animals seem to materialize every 20 seconds on the ground below. Here on the Luangwa River in Zambia, it's the dry season, and the air is bumpy with the heat. My pilot makes low-level passes in steep banking turns around every meander. I keep track of seemingly endless pods of hippos lumbering along past huge crocs, buffalo, impalas, pukus, and the occasional lion. As we near the upper end of South Luangwa National Park, I realize the local guys I've talked to are right:



GEORGE STEINMETZ

There are close to 10,000 hippos along the river.

Two hours later I'm crumpled in fetal position in a malarial haze, shivering in 95°F weather and dreaming of hippos. Seems it's always something on this voyage. This park was one more incredible place on my continuing aerial reconnaissance



of Africa's abundance. What I've seen so far is beyond anything I could have imagined, but we've still got many months and miles to go. I'll be checking in here regularly. Hope you stay with us all the way. —J. Michael Fay

MEGAFLYOVER UPDATE For Mike's regular dispatches and photographs and videos of his trip, go to nationalgeographic.com/magazine/megafllyover.

GEO QUIZ

Marking
the Year

PHIL SCHERMEISTER, CORBIS

1. According to the Muslim calendar, in what year did time begin?
2. Who decided that under the Julian calendar, the year would begin on January 1?

3. What celestial event marks the Chinese New Year, which is often celebrated with dragon dancers (left) and fireworks?
4. How did Pope Gregory XIII fix the lagging Julian calendar?
5. Japan officially uses the Gregorian calendar, but what event resets the country's traditional regnal calendar?
6. George Washington's family records note his birthday as February 11, 1731. Historians say February 22, 1732. Both are correct. Why?
7. At what time does a new day begin, according to 1884's International Meridian Conference?
8. How is Easter's date determined by certain groups within the Eastern Orthodox Church?

9. If Russia had used the Gregorian calendar in 1917 instead of the Julian, when would the October Revolution have occurred?
10. The Jewish New Year begins in September or October and is figured using both lunar and solar cycles. How long is a regular year in the Jewish calendar?
11. What Pacific island republic, because of its time zone, is among the first places on Earth to enter the new year?
12. Early Quakers once rejected month names—like January and March—derived from names of Roman gods. How did some Quakers refer to months instead?
13. Which civilization was using a 365-day calendar in 4236 B.C.?

—Katherine Ressler

1. IN A.D. 622, THE YEAR OF MUHAMMAD'S FLIGHT FROM MECCA TO MEDINA. 2. JULIUS CAESAR. 3. THE SECOND NEW MOON AFTER THE WINTER SOLSTICE. 4. HE ELIMINATED TEN DAYS FROM OCTOBER IN 1582; OCTOBER 5 BECAME OCTOBER 15. 5. ACCESSION OF A NEW EMPEROR. 6. VIRGINIA WAS A BRITISH COLONY WHEN WASHINGTON WAS BORN, AND BRITAIN USED THE JULIAN CALENDAR. 7. 1752 BRITAIN SWITCHED TO THE GREGORIAN CALENDAR. THE TWO DATES CORRESPOND TO THE TWO CALENDARS. 7. AT MIDNIGHT. 8. THEY USE THE JULIAN CALENDAR. 9. NOVEMBER. 10. 354 DAYS. 11. VANUATU. 12. THEY REFERRED TO THEM BY NUMBERS: FIRST MONTH, SECOND MONTH, AND SO ON. 13. EGYPTIAN.

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Important considerations: ZOCOR is a prescription tablet and isn't right for everyone, including women who are nursing or pregnant or who may become pregnant, and anyone with liver problems. Unexplained muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. ZOCOR may interact with other medicines or certain foods, increasing your risk of getting this serious side effect. So tell your doctor about any other medications you are taking.

ASK YOUR DOCTOR IF ZOCOR IS RIGHT FOR YOU. PLEASE READ THE MORE DETAILED INFORMATION ABOUT ZOCOR IMMEDIATELY FOLLOWING THIS AD.

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USES OF ZOCOR

ZOCOR is a prescription drug that is indicated as an addition to diet for many patients with high cholesterol. For patients at high risk of coronary heart disease (CHD) because of existing heart disease, diabetes, vascular disease, or history of stroke, ZOCOR is indicated along with diet to reduce the risk of death by reducing coronary death; reduce the risk of heart attack and stroke; and reduce the need for revascularization procedures.

WHEN ZOCOR SHOULD NOT BE USED

Some people should not take ZOCOR. Discuss this with your doctor.

ZOCOR should not be used by patients who are allergic to any of its ingredients. In addition to the active ingredient simvastatin, each tablet contains the following inactive ingredients: cellulose, lactose, magnesium stearate, iron oxides, talc, titanium dioxide, and starch. Butylated hydroxyanisole is added as a preservative.

Patients with liver problems: ZOCOR should not be used by patients with active liver disease or repeated blood test results indicating possible liver problems. (See WARNINGS.)

Women who are or may become pregnant: Pregnant women should not take ZOCOR because it may harm the fetus. **Women of childbearing age should not take ZOCOR unless it is highly unlikely that they will become pregnant.** If a woman does become pregnant while on ZOCOR, she should stop taking the drug and talk to her doctor at once.

Women who are breast-feeding should not take ZOCOR.

WARNINGS

Muscle: Tell your doctor right away if you experience any unexplained muscle pain, tenderness, or weakness at any time during treatment with ZOCOR so your doctor can decide if ZOCOR should be stopped. Some patients may have muscle pain or weakness while taking ZOCOR. Rarely, this can include muscle breakdown resulting in kidney damage. The risk of muscle breakdown is greater in patients taking certain other drugs along with ZOCOR:

- Cyclosporine, itraconazole, ketoconazole, erythromycin, clarithromycin, HIV protease inhibitors, the antidepressant nefazodone, or large quantities of grapefruit juice (>1 quart daily), particularly with higher doses of ZOCOR.
- Gemfibrozil particularly with higher doses of ZOCOR.
- Other lipid lowering drugs (other fibrates or ≥ 1 g/day of niacin) that can cause myopathy when given alone.
- Amiodarone or verapamil with higher doses of ZOCOR.

The risk of muscle breakdown is greater at higher doses of simvastatin.

Because the risk of muscle side effects is greater when ZOCOR is used with the products listed above, the combined use of these products should be avoided unless your doctor determines the benefits are likely to outweigh the increased risks.

The dose of ZOCOR should not exceed 10 mg daily in patients receiving gemfibrozil. The combined use of ZOCOR and gemfibrozil should be avoided, unless your doctor determines that the benefits outweigh the increased risks of muscle problems. Caution should be used when using ZOCOR with other fibrates or niacin because these can cause muscle problems when taken alone.

No more than 10 mg/day of ZOCOR should be taken with cyclosporine.

The combined use of verapamil or amiodarone with doses above ZOCOR 20 mg should be avoided unless your doctor determines the benefits outweigh the increased risk of muscle breakdown.

Your doctor should also carefully monitor for any muscle pain, tenderness, or weakness, particularly during the initial months of therapy and if the dose of either drug is increased. Your doctor also may monitor the level of certain muscle enzymes in your body, but there is no assurance that such monitoring will prevent the occurrence of severe muscle disease.

The risk of muscle breakdown is greater in patients with kidney problems or diabetes.

If you have conditions that can increase your risk of muscle breakdown, which in turn can cause kidney damage, your doctor should temporarily withhold or stop ZOCOR (simvastatin). Also, since there are no known adverse consequences of briefly stopping therapy with ZOCOR, treatment should be stopped a few days before elective major surgery and when any major acute medical or surgical condition occurs. Discuss this with your doctor, who can explain these conditions to you.

Liver: About 1% of patients who took ZOCOR in clinical trials developed elevated levels of some liver enzymes. Patients who had these increases usually had no symptoms. Elevated liver enzymes usually returned to normal levels when therapy with ZOCOR was stopped.

In the ZOCOR Survival Study, the number of patients with more than 1 liver enzyme level elevation to greater than 3 times the normal upper limit was no different between the ZOCOR and placebo groups. Only 8 patients on ZOCOR and 11 on placebo discontinued therapy due to elevated liver enzyme levels. Patients were started on 20 mg of ZOCOR, and one third had their dose raised to 40 mg.

Your doctor should perform routine blood tests to check these enzymes before you start treatment with ZOCOR and thereafter when clinically indicated. Patients titrated to the 80-mg dose should receive an additional test at 3 months and periodically thereafter (eg, semiannually) for the first year of treatment. If your enzyme levels increase, your doctor should order more frequent tests. If your liver enzyme levels remain unusually high, your doctor should discontinue your medication.

Tell your doctor about any liver disease you may have had in the past and about how much alcohol you consume. ZOCOR should be used with caution in patients who consume large amounts of alcohol.

PRECAUTIONS

Drug Interactions: Because of possible serious drug interactions, it is important to tell your doctor what other drugs you are taking, including those obtained without a prescription. You should also tell other doctors who are prescribing a new medicine for you that you are taking ZOCOR. ZOCOR can interact with the following:

- Itraconazole
- Ketoconazole
- Erythromycin
- Clarithromycin
- HIV protease inhibitors
- Nefazodone
- Cyclosporine
- Large quantities of grapefruit juice (>1 quart daily)

The risk of myopathy is also increased by gemfibrozil and to a lesser extent other fibrates and niacin (nicotinic acid) (≥ 1 g/day).

The risk of muscle breakdown is increased with other drugs:

- Amiodarone
- Verapamil

Some patients taking lipid-lowering agents similar to ZOCOR and coumarin anti-coagulants (a type of blood thinner) have experienced bleeding and/or increased blood clotting time. Patients taking these medicines should have their blood tested before starting therapy with ZOCOR and should continue to be monitored.

Central Nervous System Toxicity; Cancer, Mutations, Impairment of Fertility: Like most prescription drugs, ZOCOR was required to be tested on animals before it was marketed for human use. Often these tests were designed to achieve higher drug concentrations than humans achieve at recommended dosing. In some tests, the animals had damage to the nerves in the central nervous system. In studies of mice with high doses of ZOCOR, the likelihood of certain types of cancerous tumors increased. No evidence of mutations of or damage to genetic material has been seen. In 1 study with ZOCOR, there was decreased fertility in male rats.

Pregnancy: Pregnant women should not take ZOCOR because it may harm the fetus.

Safety in pregnancy has not been established. In studies with lipid-lowering agents similar to ZOCOR, there have been rare reports of birth defects of the skeleton and digestive system. Therefore, women of childbearing age should not take

ZOCOR® (simvastatin) unless it is highly unlikely they will become pregnant. If a woman does become pregnant while taking ZOCOR, she should stop taking the drug and talk to her doctor at once. The active ingredient of ZOCOR did not cause birth defects in rats at 3 times the human dose or in rabbits at 3 times the human dose.

Nursing Mothers: Drugs taken by nursing mothers may be present in their breast milk. Because of the potential for serious adverse reactions in nursing infants, a woman taking ZOCOR should not breast-feed. (See WHEN ZOCOR SHOULD NOT BE USED.)

Pediatric Use: ZOCOR is not recommended for children or patients under 10 years of age.

Geriatric Use: Higher blood levels of active drug were seen in elderly patients (70–78 years of age) compared with younger patients (18–30 years of age) in 1 study. In other studies, the cholesterol-lowering effects of ZOCOR were at least as great in elderly patients as in younger patients, and there were no overall differences in safety between elderly and younger patients over the 20–80 mg/day dosage range. Of the 7 cases of myopathy/rhabdomyolysis among 10,269 patients on ZOCOR in another study, 4 were aged 65 or more (at baseline), 1 of whom was over 75.

SIDE EFFECTS

Most patients tolerate treatment with ZOCOR well; however, like all prescription drugs, ZOCOR can cause side effects, and some of them can be serious. Side effects that do occur are usually mild and short-lived. Only your doctor can weigh the risks versus the benefits of any prescription drug. In clinical studies with ZOCOR, less than 1.5% of patients dropped out of the studies because of side effects. In 2 large, 5-year studies, patients taking ZOCOR experienced similar side effects to those patients taking placebo (sugar pills). Some of the side effects that have been reported with ZOCOR or related drugs are listed below. This list is not complete. Be sure to ask your doctor about side effects before taking ZOCOR and to discuss any side effects that occur.

Digestive System: Constipation, diarrhea, upset stomach, gas, heartburn, stomach pain/cramps, anorexia, loss of appetite, nausea, inflammation of the pancreas, hepatitis, jaundice, fatty changes in the liver, and, rarely, severe liver damage and failure, cirrhosis, and liver cancer.

Muscle, Skeletal: Muscle cramps, aches, pain, and weakness; joint pain; muscle breakdown.

Nervous System: Dizziness, headache, insomnia, tingling, memory loss, damage to nerves causing weakness and/or loss of sensation and/or abnormal sensations, anxiety, depression, tremor, loss of balance, psychic disturbances.

Skin: Rash, itching, hair loss, dryness, nodules, discoloration.

Eye/Senses: Blurred vision, altered taste sensation, progression of cataracts, eye muscle weakness.

Hypersensitivity (Allergic) Reactions: On rare occasions, a wide variety of symptoms have been reported to occur either alone or together in groups (referred to as a syndrome) that appeared to be based on allergic-type reactions, which may rarely be fatal. These have included 1 or more of the following: a severe generalized reaction that may include shortness of breath, wheezing, digestive symptoms, and low blood pressure and even shock; an allergic reaction with swelling of the face, lips, tongue, and/or throat with difficulty swallowing or breathing; symptoms mimicking lupus (a disorder in which a person's immune system may attack parts of his or her own body); severe muscle and blood vessel inflammation, sometimes including rash; bruises; various disorders of blood cells (that could result in anemia, infection, or blood clotting problems) or abnormal blood tests; inflamed or painful joints; hives; fatigue and weakness; sensitivity to sunlight; fever, chills; flushing; difficulty breathing; and severe skin disorders that vary from rash to a serious burn-like shedding of skin all over the body, including mucous membranes such as the lining of the mouth.

Other: Loss of sexual desire, breast enlargement, impotence.

Laboratory Tests: Liver function test abnormalities including elevated alkaline phosphatase and bilirubin; thyroid function abnormalities.

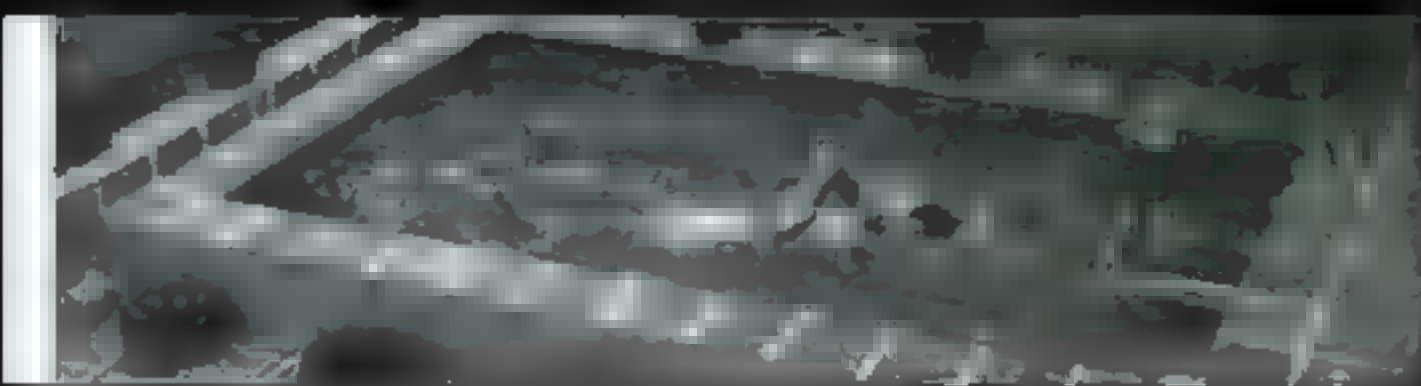
NOTE: This summary provides important information about ZOCOR. If you would like more information, ask your doctor or pharmacist to let you read the prescribing information and then discuss it with them.



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SPACE EXPLORATION

A Titanic Lunar Landing

Cassini's Huygens probe aiming for Saturn's moon

It resembles nothing so much as, well, a small flying saucer nine feet across. Yet Huygens, the probe aboard the Cassini spacecraft now orbiting Saturn, is about to make history. On Christmas Eve the probe will begin hurtling through space on its own. Then on January 14 it should touch down 800 million miles from Earth—on Titan (right).

Largest of Saturn's 33 known moons and bigger than the planet Mercury, Titan was discovered in 1655 by Dutch astronomer Christiaan Huygens. One thing that makes this moon particularly compelling to scientists is its atmosphere. Dense and nitrogen-rich, it may resemble Earth's atmosphere 3.5 billion years ago. In an October flyby of Titan, Cassini detected large, puzzling patches of light and dark. Huygens's landing

may help clarify what they are.

During a searing plunge through Titan's outer atmosphere, the probe will shed most of its speed, then parachutes will float it to a landing. Cameras will record the probe's final descent through a haze of hydrocarbons, and spectrometers and other

sensors will analyze Titan's atmosphere and surface features and send the data back to Earth. If the probe lands on a sea of liquid ethane, it could encounter looming, slow-motion waves.

Huygens will transmit from Titan for only a few hours, but "it's going to be very romantic," says David Southwood, the European Space Agency's director of science programs. "Like a trip back to Earth's formative years when our planet was only about a billion years old."

—Bill Douthitt



GEO NEWS

ASTRONOMY

■ **The world's largest telescope** is being planned by a European space consortium. The project known as the OWL—for OverWhelmingly Large—telescope calls for a 328-foot mirror; it may be operational by 2021, though its site has not yet been chosen. Planners hope OWL will offer image resolution comparable to that now obtained by space probes.

AVIATION

■ **A new solo flight record** could be set this winter, if a small jet designed by aviation pioneer Burt Rutan manages to circumnavigate the globe on a single tank of gas without stopping. The flight path has been set, but the takeoff date is dependent on weather conditions.

GEOLOGY

■ **An addition to the geologic timescale has been approved** by the International Union of Geological Sciences. The Ediacaran period, named for the soft-bodied organisms that thrived at the time, now precedes the Cambrian and extends back as far as 635 million years ago.

CONSERVATION

■ **A shark repellent made from extract of dead sharks** has been successfully tested—and could protect sharks themselves. The repellent can be used by fishermen to keep sharks away from nets and lines. Unintentional catches by commercial fishing boats may have caused some Atlantic shark populations to decline by as much as 89 percent.



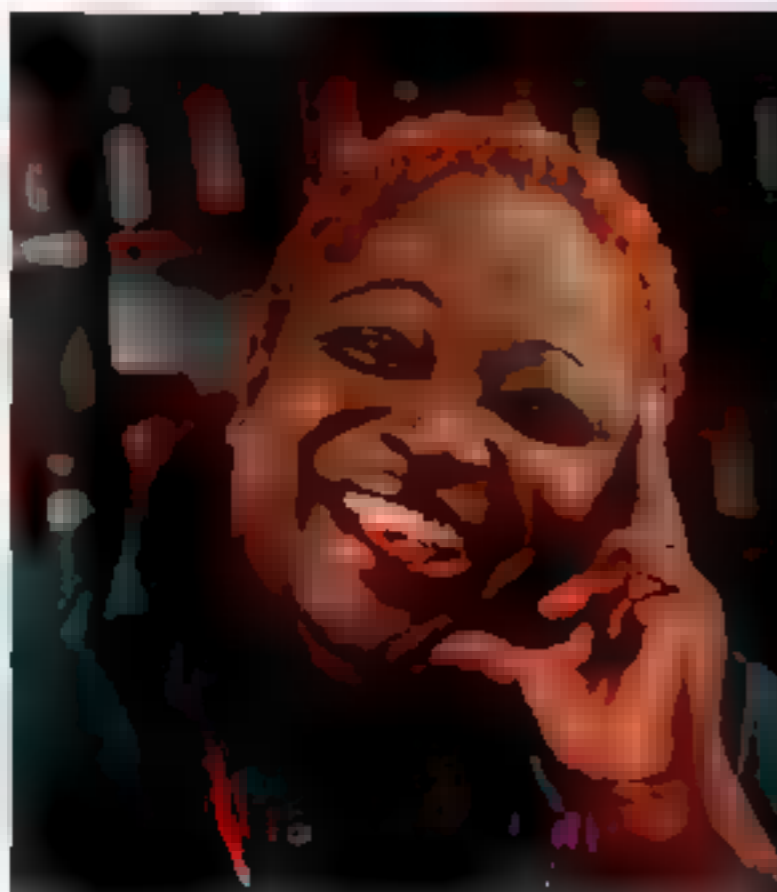
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My Seven



Celebrating the New Year With Flavor

Dorinda Hafner *Author, actress, epicure*

She grew up in Ghana, earned her degrees in England, then immigrated to Australia—where she gained fame on television as a performer and cuisine-hopping chef. Hafner knows her way around world cultures. Her seventh cookbook, *Ethnodelectious*, will be published in April. Here are her seven international ways to take a bite (or sip) of the new year.

1 Give peas a chance
In parts of the southern United States people eat a black-eyed pea and rice dish called hop-pin' John to ensure a prosperous new year. Black-eyed peas, known as cowpeas in other parts of the world, likely originated in Africa, where they're still a staple food.

2 Pop a grape
For good luck on New Year's Eve the Spanish tradition is to eat 12 grapes—one at each toll of the bell—as the clock strikes midnight.

3 Round out
In my own Asante culture we say that round or oval-shaped foods like eggs promote fertility and abundance. In the Netherlands they traditionally make special doughnuts called *oliebollen* (above) for the new year. Do the Dutch know about the fertility thing?



PETER FISHER (TOP LEFT); INGE YSPEERT

4 Cheers!
Champagne helps people celebrate this holiday all over the world. But where I live, in Australia, the Southern Hemisphere's New Year arrives in summer—and many Australians do enjoy a beer with their barbecue.

5 Sticky sweet
The Jewish holiday of Rosh Hashanah comes in September some years, October in others. Its culinary

custom is to eat apple slices dipped in honey or a honey cake to promote sweetness in the new year.

6 Whole thing
For Chinese lunar New Year, feast foods are often served in their whole forms: A fish still has its head and tail, a chicken is presented with its head and feet. Whole oranges are said to bring wealth and luck. Even long noodles, which represent longevity, are served uncut.

7 Hole thing
There's an old form of ancestral prayer that I grew up with in Ghana: Dig a hole. Then speak into that hole all the bad that happened in the old year and cover those words with dirt. Speak softly all the good that you hope to happen for you, your friends, and your family. Next, pour a libation of palm wine or schnapps over the ground to honor your ancestors. Finally, drink a bit of it yourself.



The most self-indulgent car ever built? Or the least?

Take a moment to consider. For starters, it has 255 horsepower. Then take into account the heated front seats, automatic climate control and available Honda Satellite-Linked Navigation System.* Not to mention the leather interior and the XM* Satellite Radio.† Also, it's designed to achieve 29 city/37 highway,‡ and it's all part of the well-equipped Accord Hybrid. So? What's your answer?



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ON THE ROAD IN THE FIELD

ON THE ROAD, IN THE FIELD



GOVERNMENT

C O V E R I N G T H E W O R L D

SUBJECTS

Fleas' Company

Too close to comfort in Morocco

There aren't many hotels in the High Atlas mountains, so during her 10 weeks in the Moroccan mountains, photographer **Alexandra Boulat**, 38, had to depend on hospitable villagers. She shared floor space with her driver, Saïd Oucherif Ait Lemkadem, 40, and a guide, Abdel Ben Sadiq, while outdoor-dwelling sheep and goats were also present. Fleas did become a problem, but says Boulat, "There was no other way. It was too cold to sleep outside." Even inside, temperatures dropped to freezing. The rooms were heated only by woodstoves, and it wasn't safe to keep fires burning all night. Alexandra says she stayed warm in her sleeping bag. *—Lisa Schwarzbaum/Photo.com*





BY LOUIS MAZZATENTA

ITALY BEFORE THE ROMANS

The Backrest of the Story

The stone seats encircling the ancient theater had a little something extra, noticed writer **Erla Zwinglo** (above, at right): lumbar support. Toward the end of the second century B.C. the Samnites living near modern-day Pietrabbondante, about 120 miles east of Rome, had carved a subtle curve into the theater's backrests. Though the seats weren't exactly shaped to fit the writer's petite frame, "I guess if I were sitting there watching a play or having one of their long, long meetings, I might very well be glad that curve was there," she says. The Romans appropriated several good ideas from the Samnites and other early Italians, Erla notes. Back-friendly, ergonomic chairs were not among them, however. "The Romans were so practical," she says. "I'm surprised they never said, 'We like this lumbar thing, and we're going to keep on doing it.' But they didn't."

A former GEOGRAPHIC editor, Erla was born in the U.S. and for

the past ten years has made her home in Venice, Italy. She's often reported on that country's antiquities. "I've been to so many archaeological sites," she says, "and it all seems so serious, so far away from us." But something archaeologist Adriano La Regina, at left, found at Pietrabbondante pulled the past a little closer for her. La Regina, who started digging at the site in 1959, showed Erla a Samnite temple's roof tile—inscribed with names and stamped with two pairs of footprints.

La Regina's theory is that two slave girls working in a tile factory decided to play a game one day. Each stepped on the soft clay square and inscribed her name and her master's. They probably never imagined that their mischief would be discovered. The roof tile would have been placed too high up on the temple for anyone to see.

For Erla, the Samnite tile collapsed time, bringing into focus a moment when two slave girls decided to leave their mark.

WORLDWIDE

HOT COFFEE, MISSISSIPPI

Staff writer **Peter Gwin** had a hard time locating any coffee when he first got to Hot Coffee—it's more of a sweet iced tea town—but the "hot" part was easier. Mississippi's summer weather gave him a taste of his own childhood in the American South. "Even the sounds of the cicadas seemed very familiar," says the Georgia native.

CAFFEINE

Reporting on caffeine sounded easy to writer **T. R. Reid**. He's hiked, biked, and climbed mountains in pursuit of stories for NATIONAL GEOGRAPHIC before. Surely he could lift a cup of caffè latte. But the subject proved to be a wake-up call. By night Tom immersed himself in the energy-drink-fueled club scene; by day he visited spots like illy Caffè's tasting room in Trieste, Italy (below). Not surprisingly, sleep was elusive. Says Tom, "I got the world's best coffee, I got great tea, I tried dozens of energy drinks, but I do have to say, it was much more exhausting than I ever expected caffeine to be."



BOB SACHA

WEBSITE EXCLUSIVE Find more stories from our authors and photographers, including their best, worst, and quirkiest experiences, at nationalgeographic.com/magazine/0501.

Who Knew?

NEUROSCIENCE

You Feel That?

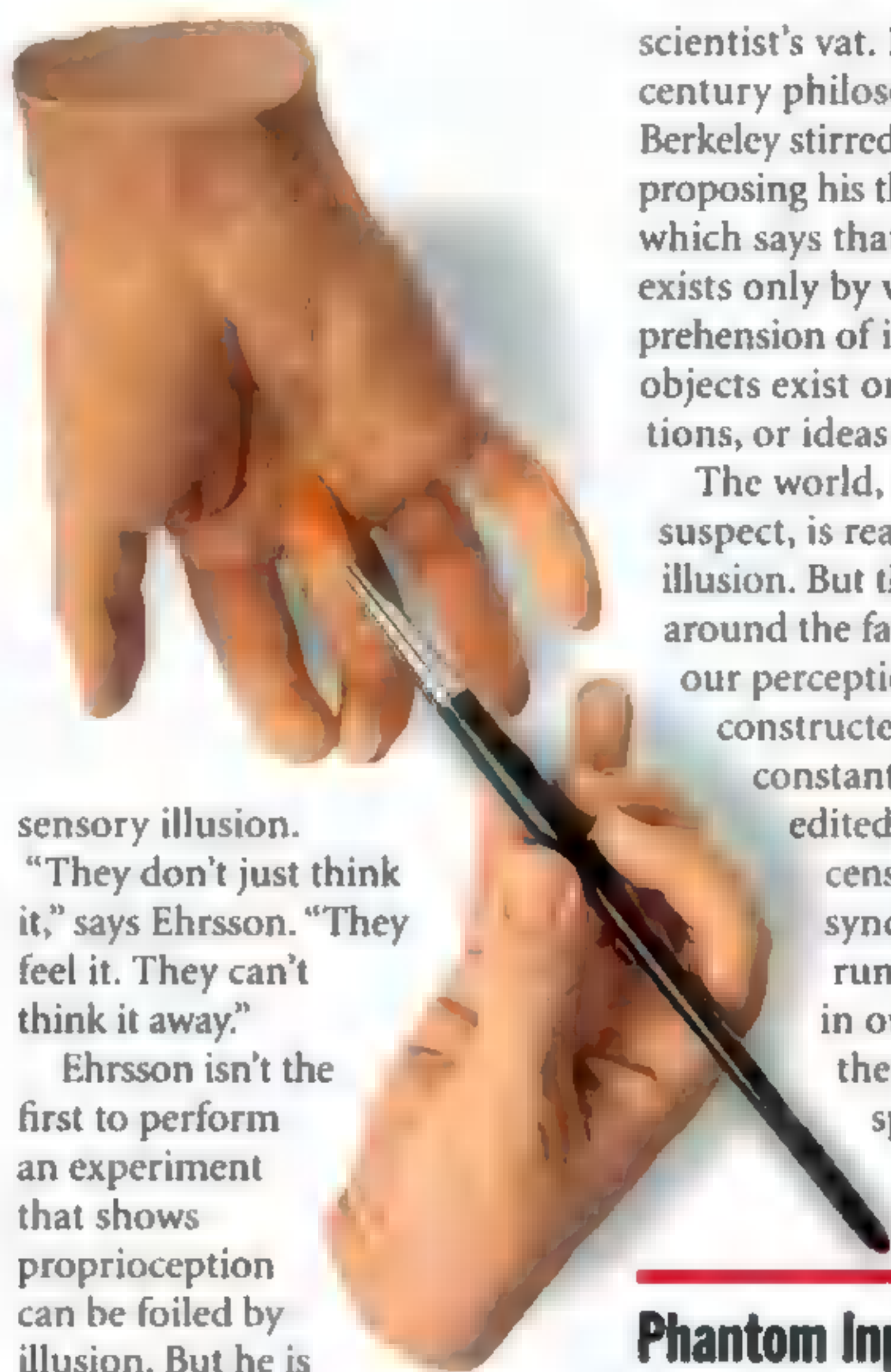
It's not so hard to fool your sense of touch

Most of us are pretty confident in our body ownership. We see appendages emerging from our shoulders and think: These are my arms. That multiple-digit tool at the end of my arm is my hand. I need to trim my nails. And so on. The awareness we have of our body position in space is called proprioception.

But science is good at probing the fragile superstructure of things we take for granted. It turns out that proprioceptive cues can be fooled easily.

Recently a neuroscientist named Henrik Ehrsson performed an experiment in which a subject was positioned in an MRI machine with his right hand resting on his leg beneath a solid surface; a realistic rubber right hand rested atop the surface. A researcher used a small brush to stroke the finger of the real hand, which the subject could not see, while simultaneously stroking the corresponding finger on the rubber hand that the subject could see.

Within 15 seconds the test subjects typically developed a profound sense that the rubber hand was the real hand. The test subjects would flinch when Ehrsson threatened to smash his fist on the rubber hand. They were surprised when they realized they were unable to lift a rubber finger. They knew what was going on, but no amount of rational thought could dispel the



sensory illusion.

"They don't just think it," says Ehrsson. "They feel it. They can't think it away."

Ehrsson isn't the first to perform an experiment that shows proprioception can be fooled by illusion. But he is the first to use brain scans to study which portions of the brain are active during the experiment. He believes that the sense of body ownership is controlled by the premotor cortex, a region of the brain that integrates vision and body movement.

That doesn't sound controversial to most of us, but it's a leap of sorts, for it takes a hard-science, technological approach to a question philosophers have debated for centuries. To what extent can we actually believe that we and the world around us are real? In the 17th century René Descartes stated, "I think, therefore I am." But that didn't exactly prove that he wasn't just a brain soaking in a mad

scientist's vat. Eighteenth-century philosopher George Berkeley stirred up the debate by proposing his theory of idealism, which says that the real world exists only by virtue of our apprehension of it—that material objects exist only as conceptions, or ideas in our minds.

The world, we strongly suspect, is real, and not an illusion. But there is no getting around the fact that many of our perceptions are internally constructed. It's like a movie constantly being filmed, edited, and sometimes censored by an idiosyncratic director running around in our skulls. And there are plenty of special effects.

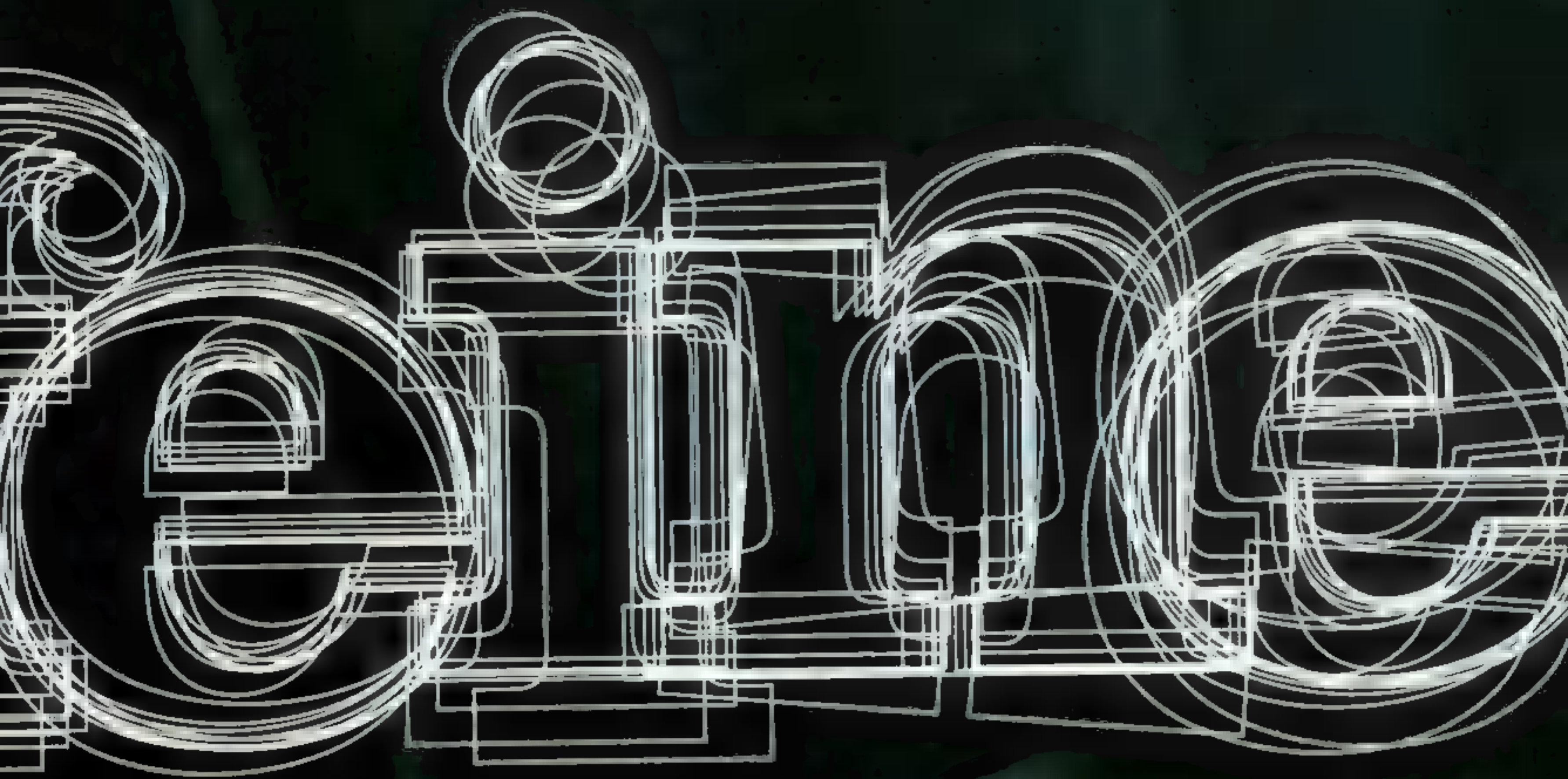
—Joel Achenbach
WASHINGTON POST
STAFF WRITER

Phantom Input

Awareness of body parts can remain in effect even after an arm or leg is gone. Amputees often experience sensations, sometimes painful, of phantom limbs, even to the point of believing they are moving them—clenching a fist, grasping a pencil, waving goodbye, shaking a leg. The sensations are not caused by activity in remaining muscles. Some scientists suspect that without tactile inputs to stimulate sensations, the brain establishes new neural connections that project the signals it no longer receives. —Heidi Schultz

WEBSITE EXCLUSIVE For more about proprioception, and for links to Joel Achenbach's work, go to Resources at nationalgeographic.com/magazine/0501.

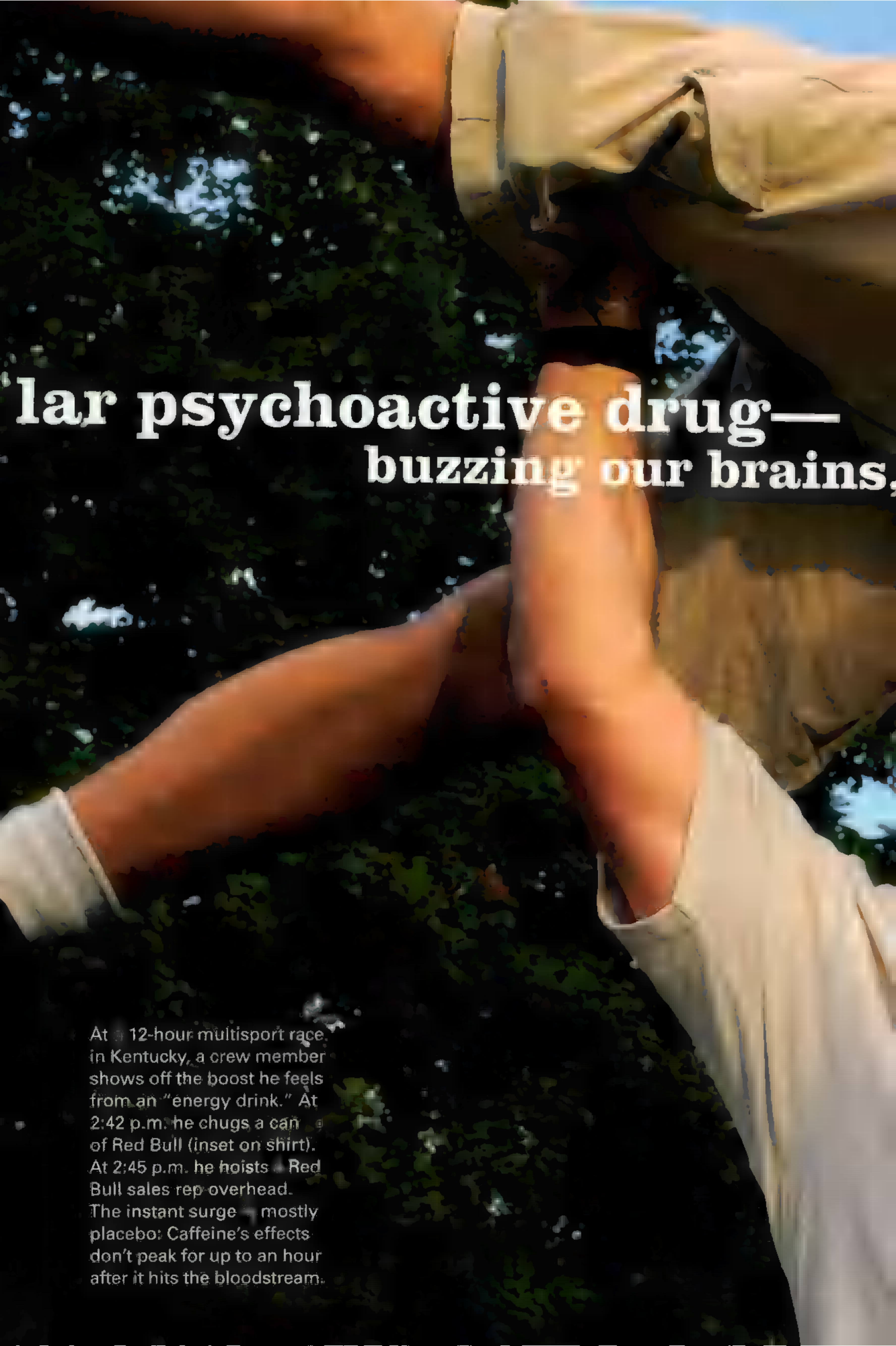




By **T. R. Reid** Photographs by **Bob Sacha**

It's the world's most popu-

Richard Wurman knocks
back at least a quart
of coffee a day. The MIT
medical researcher credits
the 600- to 800-milligram
daily caffeine in his mugs
with keeping his mind
sharp and his creativity.

A photograph showing a person in a white shirt hoisting another person over their shoulder. The background is a dark, dense forest. The text is overlaid on the image.

lar psychoactive drug— buzzing our brains.

At a 12-hour multisport race in Kentucky, a crew member shows off the boost he feels from an “energy drink.” At 2:42 p.m. he chugs a can of Red Bull (inset on shirt). At 2:45 p.m. he hoists a Red Bull sales rep overhead. The instant surge is mostly placebo: Caffeine’s effects don’t peak for up to an hour after it hits the bloodstream.



fraying our nerves, robbing our

Just Another
Adventure
Time

Racing toward enlightenment, a junior monk delivers a kettle of butter tea to his more advanced brethren at a Buddhist monastery in southern India. Caffeine and calories in the steaming blend of black tea, milk, butter, and salt fuel early morning hours of prayer and spiritual debate.



sleep. And we simply refuse

A group of people are sitting on the floor in a dimly lit room. The lighting is predominantly red, creating a somber and intense atmosphere. The people are dressed in dark, heavy clothing. The background is dark and indistinct, suggesting an indoor setting with low light levels. The overall mood is one of hardship or struggle.

to survive without it.

“Power! Money! Lust! Sex!” “Power! Money! Lust! Sex!”

Over and over, the throbbing chorus of a dance hit explodes out of a battery of seven-foot-tall speakers so powerful that the wood dance floor trembles, earthquake style, with every reverberating bass note. Through a purple haze of smoke and sweat the strobe lights' red glare illuminates the dancing couples: men with mohawks and painted faces, women in vinyl skirts so micro they serve no functional purpose. It's 4:45 a.m. at the popular London club Egg, and a few dancers have collapsed on the sofas or taken refuge at the bar. But after a long night of liquor, drugs, tobacco, and earthshaking noise, most are still vigorously, and happily, strutting their stuff across that trembling wood floor. How do they do it?

“Actually, we usually see a revival about half four or so in the morning,” says Egg night manager Simon Patrick. “That’s when we get the real rush at the bar for Red Bull. And the kids say, ‘I’ve had eight Red Bulls—I’m flying!’ They’ll dance right round the clock. At seven in the morning we have trouble getting them out the door.”



>> Studies suggest that extroverted people are less sensitive to

"It's like putting your whole system on fast-forward," Lee Murphy shouts above the din as he glides across the floor with four-inch-high soles on his dancing shoes, a gold ring in his chin, and a slender silver and blue can of Red Bull energy drink in each hand. "By four or five in the morning you're totally blotto," the 29-year-old London nurse explains. "That's where the Red Bull comes in.

I drink these two tins, it's like drinking a pint of speed."

For Lee Murphy and other habitués of the all-night club scene around the world—not to mention a legion of marathon runners, mountain bikers, fighter pilots, college crammers, and late-night truckers hoping to cover another hundred miles before turning in—the canned concoctions

marketed as energy drinks represent a fizzy new manifestation of one



Small, illegible text block, possibly a caption or a small advertisement, located in the lower right quadrant of the image.

caffeine's effects than introverts. Pain relievers fortified



...the caffeine have proven more effective than the analgesics used

No fan of what he calls “the waves of sugar” in Coke, MIT graduate student Nathan Wilson mixes his own power tonic for a long night’s work in the neuroscience lab. He quarters a 200-milligram caffeine pill (above) and dissolves 50 mg in Gatorade (right). Wilson is part of a huge market: Every year U.S. consumers spend 30 million dollars on caffeine tablets and an estimated 50 billion dollars on caffeinated soda.



of mankind's oldest stimulants: caffeine. The active ingredient in the hugely successful Austrian product Red Bull is a solid jolt of caffeine, blended with a handful of other ingredients. One 8.3-ounce can has two to three times the amount of caffeine as a 12-ounce can of soda.

"The kids in the clubs, they think they've happened upon this great new invention," says Neil Stanley, director of sleep research at the Human Psychopharmacology Research Unit at Britain's University of Surrey. "But we've known for centuries that caffeinated drinks work. They get you out of an energy slump and make you more alert. Really all they've found is a new kind of caffeine delivery system."

The dual power to counter physical fatigue and increase alertness is part of the reason caffeine ranks as the world's most popular mood-altering drug, eclipsing the likes of nicotine and alcohol. The drug is encountered not just at the soda fountain or the espresso bar but also in diet pills and pain relievers. It is the only habit-forming

psychoactive drug we routinely serve to our children (in all those sodas and chocolate bars). In fact, most babies in the developed world enter the universe with traces of caffeine in their bodies, a transfer through the umbilical cord from the mother's latte or Snapple.

Caffeine's pervasiveness is a cause for concern among some scientists and public health advocates, but that hasn't dampened its popularity. Sales of Red Bull and copycat energy drinks with names like Red Devil, Roaring Lion, RockStar, SoBe Adrenaline Rush, Go Fast, and Whoop Ass are booming. Meanwhile new coffee shops are opening so fast all over the world that even the most dedicated devotee of the triple-shot, no-foam, double-caramel, skinny macchiato can't keep track. Every working day, Starbucks opens four new outlets somewhere on the planet and hires 200 new employees. There's a joke in many cities that Starbucks is going to open a new store in the parking lot of the local Starbucks, but this is not true. Yet.

How big is your buzz?

Drugmakers have to label the amount of caffeine in their offerings, but food and beverage companies don't. A sample of familiar products shows how fast your dose can add up.

Hershey's milk chocolate almond bar, 6 oz.....	25 mg
Espresso, 1-oz shot.....	40 mg
Brewed tea, 8-oz cup.....	50 mg
Coca-Cola, 20-oz bottle.....	57 mg
Red Bull energy drink, 8.3-oz can.....	80 mg
Excedrin pain reliever, 2 tablets.....	130 mg
Brewed coffee, 12-oz cup.....	200 mg
Mountain Dew, 64-oz Double Big Gulp.....	294 mg

alone. The robusta coffee beans used in less expensive brands



contain almost twice as much

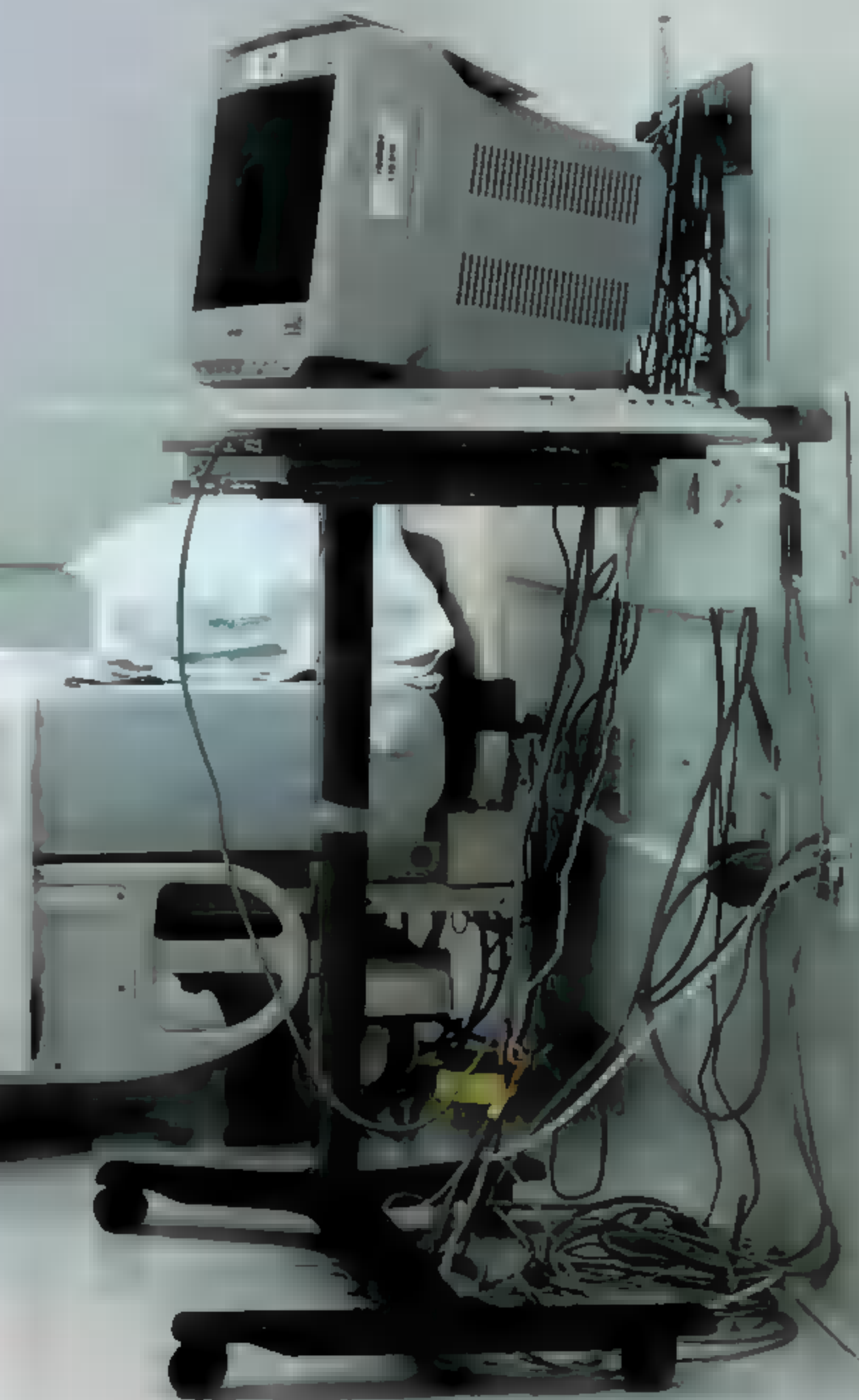
caffeine as the

arabica beans favored by coffee



Military studies of subjects who hadn't slept for 48

connoisseurs.

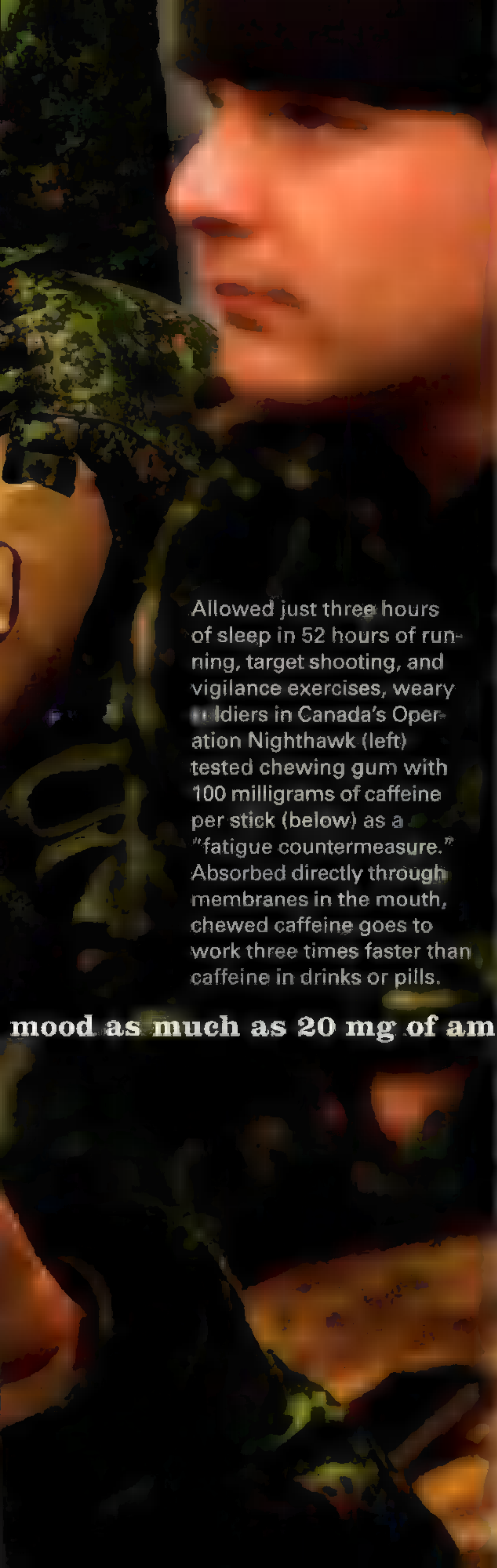


Living on a 43-hour "day" (29 hours awake, 14 asleep) during a month-long study at Brigham and Women's Hospital in Boston, Conor O'Brien (left) and 15 other volunteers took a pill every waking hour. Some got placebos, some got caffeine. Project head Charles Czeisler and his team concluded that frequent small amounts of caffeine maintain alertness better than the classic morning jolt from a big cup of coffee—fine-tuning our understanding of the drug's numerous physical effects.



hours showed that 600 mg of caffeine improved alertness and





Allowed just three hours of sleep in 52 hours of running, target shooting, and vigilance exercises, weary soldiers in Canada's Operation Nighthawk (left) tested chewing gum with 100 milligrams of caffeine per stick (below) as a "fatigue countermeasure." Absorbed directly through membranes in the mouth, chewed caffeine goes to work three times faster than caffeine in drinks or pills.

mood as much as 20 mg of amphetamine.

It was less than 200 years ago that people first figured out that the buzz they got from coffee and tea was the same buzz, produced by the same chemical agent. An alkaloid that occurs naturally in the leaves, seeds, and fruit of tea, coffee, cacao, kola trees, and more than 60 other plants, this ancient wonder drug had been prescribed for human use as far back as the sixth century B.C., when the great spiritual leader Lao-tzu is said to have recommended tea as an elixir for disciples of his new religion, Taoism.

But it wasn't until 1820, after coffee shops had proliferated in western Europe, that a new breed of scientist began to wonder what it was that made this drink so popular. The German chemist Friedlieb Ferdinand Runge first isolated the drug in the coffee bean. The newly discovered substance was dubbed "caffeine," meaning something found in coffee. Then, in 1838 chemists discerned that the effective ingredient in tea was the same substance as Runge's caffeine. Before the end of the century the same drug would be found in kola nuts and cacao.

It's hardly a coincidence that coffee and tea caught on in Europe just as the first factories were ushering in the industrial revolution. The widespread use of caffeinated drinks—replacing the ubiquitous beer—facilitated the great transformation of human economic endeavor from the farm to the factory. Boiling water to make coffee or tea helped decrease the incidence of disease among workers in crowded cities. And the caffeine in their systems kept them from falling asleep over the machinery. In a sense, caffeine is

Going without

the drug that made the modern world possible. And the more modern our world gets, the more we seem to need it. Without that useful jolt of coffee—or Diet Coke or Red Bull—to get us out of bed and back to work, the 24-hour society of the developed world couldn't exist.

"For most of human existence, your pattern of sleeping and wakefulness was basically a matter of the sun and the season," explains Charles Czeisler, a neuroscientist and sleep expert at Harvard Medical School. "When the nature of work changed from a schedule built around the sun to an indoor job timed by a clock, humans had to adapt. The widespread use of caffeinated food and drink—in combination

with the invention of electric light—allowed people to cope with a work schedule set by the clock, not by daylight or the natural sleep cycle.”

Czeisler, who rarely consumes any caffeine, is a bundle of wide-awake energy in his white lab coat, racing around his lab at Boston’s Brigham and Women’s Hospital, grabbing journal articles from the shelves and digging through charts to find the key data points. “Caffeine is what’s called a wake-promoting therapeutic,” he says.

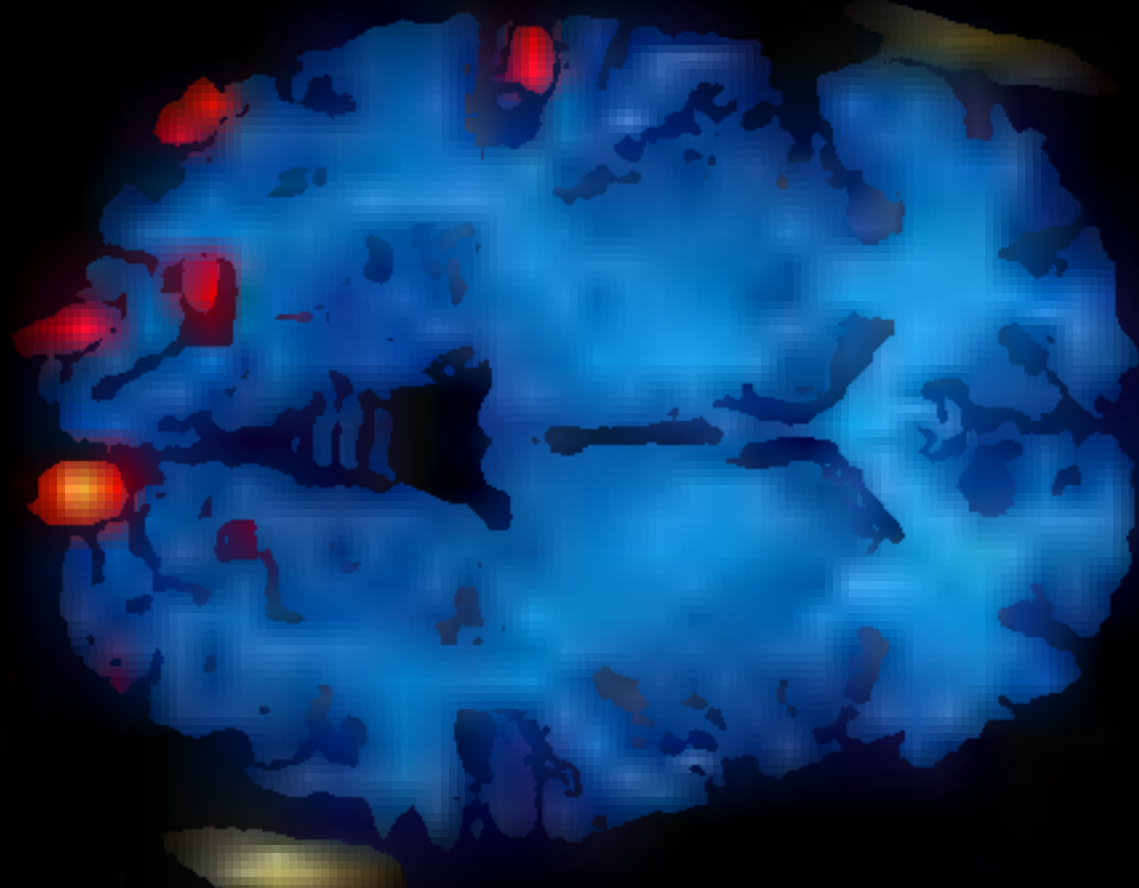
Scientists have developed various theories to explain caffeine’s “wake-promoting” power. The consensus today focuses on the drug’s interference with adenosine, a chemical in the body that acts as a natural sleeping pill. Caffeine blocks the hypnotic effect of adenosine and keeps us from falling asleep. Since caffeine has also been shown to enhance mood and increase alertness

amounts of coffee or tea on the day you arrive to stay alert—preferably out in the sunshine—until your regular bedtime in your destination. (During weeks of global travel for this article, it worked for me.)

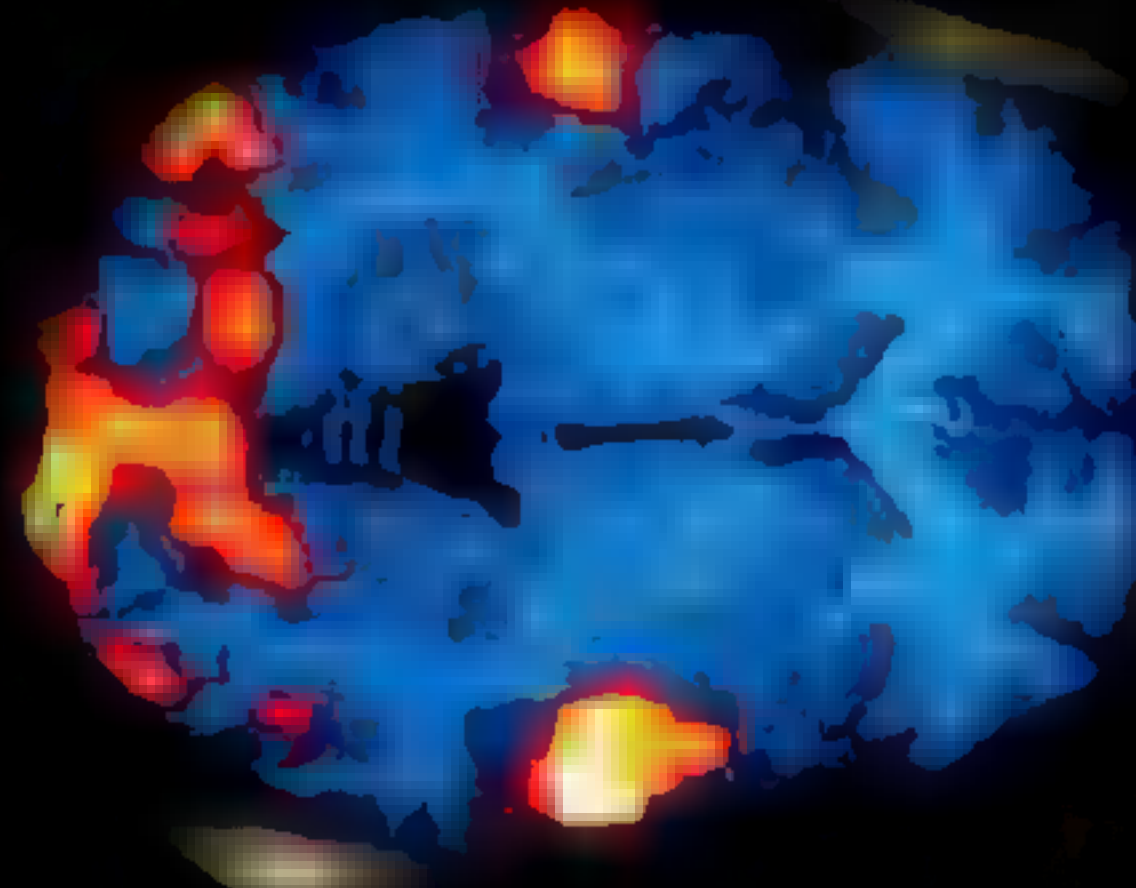
“Caffeine helps people try to wrest control away from the human circadian rhythm that is hardwired in all of us,” says Czeisler. But then a shadow crosses the doctor’s sunny face, and his tone changes sharply. “On the other hand,” he says solemnly, “there is a heavy, heavy price that has been paid for all this extra wakefulness.” Without adequate sleep—the conventional eight hours out of each 24 is about right—the human body will not function at its best, physically, mentally, or emotionally, the doctor says. “As a society, we are tremendously sleep deprived.”

In fact, the professor goes on, there is a sort

Heavy Users Without Caffeine



Heavy Users With Caffeine



caffeine for a day and a half increases blood flow in the brain,

in moderate amounts, it’s a potent potion for students and scholars stuck in the lab at three in the morning. Paul Erdős, the Hungarian mathematician who often worked his equations around the clock, is known for saying that “a mathematician is a machine for turning coffee into theorems.”

Caffeine’s ability to murder sleep also makes it a drug of choice for long-distance travelers. There are as many different jet-lag remedies as there are seats on a trans-Pacific flight. But one approach, outlined in *The Caffeine Advantage* by Bennett Alan Weinberg and Bonnie K. Bealer, involves abstaining from caffeine for several days before traveling, then dosing yourself with small

of catch-22 at the heart of the modern craving for caffeine. “The principal reason that caffeine is used around the world is to promote wakefulness,” Czeisler says. “But the principal reason that people need that crutch is inadequate sleep. Think about that: We use caffeine to make up for a sleep deficit that is largely the result of using caffeine.”

Dietrich Mateschitz isn’t losing sleep over how much caffeine he consumes. A big, friendly man with a big, friendly smile that beams out from his stubble of white beard, the Austrian marketing whiz describes himself as “comfortable with risk,” whether he’s climbing a rocky

cliff, helicopter skiing, mountain biking an impossibly steep trail in the Alps—or doing business. Mateschitz ought to be comfortable with risk, because the biggest chance he ever took paid off in spectacular fashion, placing a whole new product on supermarket shelves, spawning hundreds of competitors, and making himself a billionaire, all within 15 years.

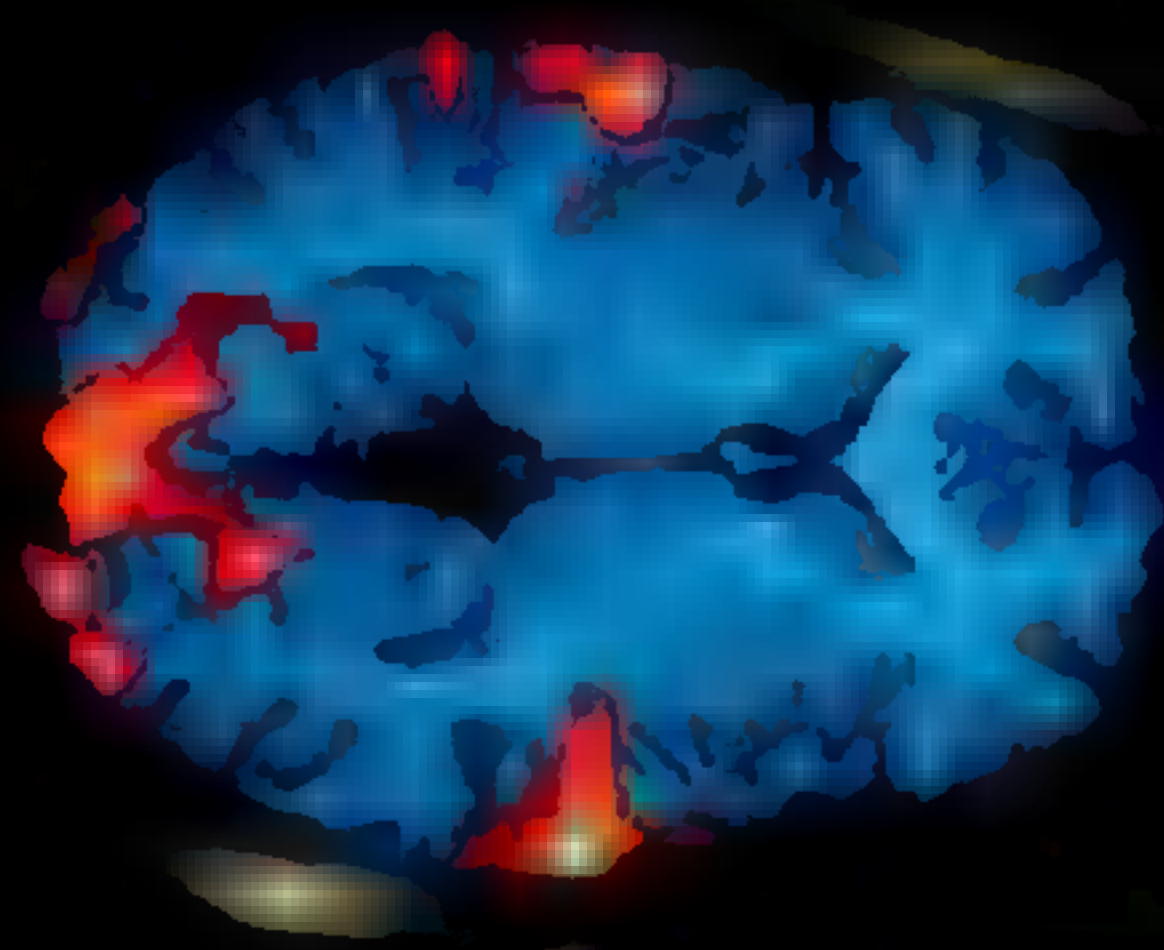
In the 1980s Mateschitz was working for Blendax, a German cosmetics company, marketing skin care products and toothpaste in East Asia. His regular overnight flights from Frankfurt to Tokyo and Beijing inevitably resulted in jet lag, which Mateschitz came to despise. He was a salesman, after all; he needed to be at the peak of energy to do his job right. But the long flights left him drained and worn. He began to notice that taxi drivers in most Asian cities were

taurine, and a carbohydrate, glucuronolactone. The Austrian quit his toothpaste-selling job and invested his life savings in a license to sell Krating Daeng in the West. After tinkering somewhat with the flavoring and the packaging—and adding carbonation—he launched the beverage in Europe in the late 1980s.

At first, stores didn't know what to do with an energy drink. There was no such product, and thus no market for it. Mateschitz solved that problem with a brilliant marketing campaign. "You don't drink Red Bull. You use it," the ads proclaimed. "You've got better things to do than sleep." "Red Bull gives you wings."

Red Bull began organizing extreme sporting events, ranging from kitesurfing, streetluge, and paragliding to its Flügtag championships (that is, human-powered flying machines) and its own

Light Users Without Caffeine



Your Brain on Caffeine

Feel fuzzy-headed without your morning java? When users accustomed to a daily average of 650 milligrams of caffeine (about three 12-ounce cups of coffee) went without their usual fix, visual and auditory activity in the brain (indicated by bright colors in scans at left) was low. Giving them 250 mg of caffeine boosted activity—but only up to levels equal to those of infrequent users who'd had no caffeine. "If you regularly get a hefty dose," says Wake Forest University researcher Paul Laurienti, "you need it for your brain to function normally."

which may explain why people get headaches when they first

regularly sipping from small bottles of tonic. After one exhausting flight to Bangkok, he asked the cab driver to share the drink.

Eureka! "Jet lag was gone," he recalls. "Suddenly, I felt so awake." Relating the story nearly two decades later, Mateschitz still remembers the sheer excitement of that moment of discovery. "I found these drinks all over Asia, and there were huge markets for them. I started thinking: Why doesn't the West have this product?"

The West, of course, already had the key ingredient of those Asian mixtures: caffeine. The drink that worked so well for Dietrich Mateschitz, a Thai tonic named Krating Daeng (that is, Red Bull), was a blend of caffeine, an amino acid called

Seifenkistenrennen, or Soap Box Derby. The target market was the educated, vigorous, and well-paid European youth culture—people who spent long days on the trading floor and the running track and long nights at downtown clubs, dancing and drinking until dawn.

By the turn of the century, the hottest new cocktail among Europe's clubbing set was the Vodka Bull, Red Bull mixed with vodka. (You can also buy a Bullgarita, which is Red Bull with tequila, a Chambull, which is Red Bull with champagne, or a Bullmeister, which is Red Bull with Jägermeister.) "Red Bull rocks, right around the clock," the company said in its advertising, including the helpful assurance that "Adding



give it up. >> Caffeine is so acidic that it's used as a standard for "bitter" in training professional



Here's what's missing from your decaf: a shovelful of caffeine and wax residues rises from the muck as workers decaffeinate coffee beans at a plant in Trieste, Italy. Tasters sampling brews for an Italian coffee retailer (left) limit their caffeine intake by spitting out most of what they slurp.



food tasters. >> The caffeine extracted from coffee beans to

Studies at the University of Connecticut's Human Performance Laboratory (above) suggest that caffeine does *not* cause dehydration in moderate amounts. Contrary to popular belief, our bodies retain as much fluid from caffeinated liquids as they do from water. That's good news for Finns, who drink more coffee per capita than anyone else. The average Finn ingests an estimated 145 grams of caffeine (right) a year.



alcohol does not change Red Bull's properties."

Red Bull arrived in the United States in 1997, promoting a series of extreme sporting events and hiring "social superstars" on college campuses to serve as Red Bull brand managers. Today the product is in more than a hundred countries, selling close to two billion cans a year.

The home office of Red Bull, in a breathtaking corner of the Austrian Alps beside a blue jewel of a mountain lake called the Fuschlsee, feels more like an upscale beach club than the world headquarters of a multibillion-dollar corporation. Mateschitz asked the architect to create the building in the form of two erupting volcanoes to reflect the product's explosive sales growth. Young staffers in tank tops and denim fill the company parking lot with their mountain bikes; a large black dog sleeps under the 20-foot-high palm trees in the lobby outside the CEO's office. Herr Mateschitz, now 60, follows the code, wearing jeans and loafers to work (no socks) and joining in beach volleyball games on the lakefront with his junior executives.

Mateschitz modestly plays down his own role in the success of Red Bull and gives all the credit to the "formula." "In marketing, you differentiate from existing products," he says. "Now coffee offers the caffeine, but in a bitter form, not cold and refreshing. Other soft drinks are refreshing and thirst quenching, but they offer no benefits. Pleasure was a good thing to market, but we saw that there was a place also in that market for efficacy, for a pleasurable drink that serves a function. This is the niche; this is Red Bull."

make decaf is sold to drug and soft drink manufacturers. >>

The idea of giving a soft drink a "function" by adding in hefty doses of a habit-forming drug makes some people more than a little nervous. France and Denmark have banned energy drinks like Red Bull altogether, citing health concerns about the elevated caffeine level, as well as the addition of other supplements. Initially, even cans of Red Bull sold in its home country, Austria, carried the warning *Nicht mit Alkohol mischen*—Don't mix with alcohol.

Alarms were raised in Ireland after an 18-year-old basketball player drank several cans of Red Bull before a game—and then collapsed and died on the court. A coroner's inquest was inconclusive about whether Red Bull had contributed to

this sudden death. But the unexplained collapse of an athletic young man prompted the government in Dublin to establish a Stimulant Drinks Committee to study the impact of energy drinks on Ireland's public health.

"The first thing I noticed, when the committee was meeting, was how much coffee they drank," says Martin Higgins, the energetic chief executive of Ireland's food safety promotion board, which supervised the study. "I guess we all have to get our stimulants one way or another." Although the committee looked at all the ingredients of Red Bull and similar products, it concluded that caffeine was the major attraction. "It wasn't so much energy or physical strength that people were buying," Higgins says. "It was that caffeine buzz, particularly in the nightclub setting. And it was the caffeine that prompted the most concern from the committee."

In the end, the Stimulant Drinks Committee found no serious risk from consumption of caffeinated energy drinks—at moderate levels. The group recommended warning labels saying the drinks are unsuitable for children, pregnant women, and people sensitive to caffeine, as well as public health reminders that caffeinated energy drinks should not be consumed for rehydrating purposes during sports or exercise.


Last year the European Union, guided in part by the Irish study, began requiring packaged drinks with more than 150 milligrams of caffeine per liter to be labeled "high caffeine content" drinks. By that standard, Red Bull and most of its competitors are high-caffeine beverages—so

is any cup of coffee, for that matter—but most colas and other soft drinks are not. The labeling requirement applies in all 25 EU nations. Australia and New Zealand have also adopted warning requirements. The United States has no such rule, but many canned energy drinks sold in the U.S. carry warnings anyway.

One member of Ireland's Stimulant Drinks Committee who was not at all satisfied with its proceedings—indeed, he decided to withdraw from the study group—is Jack James, a psychologist who believes there is little to be gained from labeling some drinks high caffeine. He says that such a label implies consumers are perfectly safe in drinking beverages (Continued on page 26)



Caffeine is being developed as a pesticide for slugs and snails.

A wide-angle photograph of a tea plantation in the Dartmoor region of Devon, England. The landscape is a rolling green hillside covered in rows of tea bushes. Several workers are visible, some sitting on the ground and others standing, engaged in tea-picking activities. The background shows a hazy, mountainous landscape under a soft, overcast sky. The overall scene is peaceful and scenic, showcasing the traditional tea-growing industry in this region.

At an organic tea garden
in the Dartmoor region
of Devon, UK, Camellia
sinensis bushes are planted
by hand, as they have been
since the British began
widespread tea cultivation
in the 1830s. Producing
around two billion pounds
a year, UK is the globe's
largest tea grower.

>> A university student in Wales committed suicide in 2002

when



be deliberately swallowed caffeine pills equivalent to 100 cups of coffee.

Hand labor remains crucial to the production of India's prized teas, from harvest to fermentation to grading the final product. Tea is a 750-million-dollar annual business in the eastern state of Assam, where local militants have funded terrorist activity by kidnapping tea executives for ransom. To limit risks, some plantation managers travel with armed guards (inset) of the Assam Tea Plantation Security Force.

Black



with lower levels of caffeine, a conclusion he says isn't supported by the evidence. While consumers around the world continue their intake of the drug year after year, James sits in his spartan office at the National University of Ireland's Galway campus, documenting the reasons they should stop. A colleague once dubbed him a caffeine crusader. An Australian native with curly hair, wire-rim glasses, and a steely determination, James sips at a glass of tepid water over the course of a four-hour interview. Previously a daily consumer of caffeine, he's mostly sworn off the stuff for years. "People at the scientific meetings say to me, 'Hey, Jack, want a coffee?'"

James has criticized research reports funded by the soft drink and coffee industries, which he says portray caffeine as a benign substance while ignoring evidence of its potential adverse effects. His own research papers warn that caffeine is a

most popular drug is not dangerous at moderate levels of consumption—up to 300 milligrams (one to two small—12-ounce—take-out cups of coffee or six to eight cans of soda a day).

Caffeine is still a drug, though, which may explain why it makes people worry. Over the years population studies have shown that people who consume caffeine have higher rates of kidney and bladder cancer, fibrocystic breast disease, pancreatic cancer, and osteoporosis. Yet such findings cannot prove that caffeine caused the disease. All that can be studied are short-term effects.

Like other drugs, caffeine does have a definite impact on mental and physical functions. Repeated studies have shown that caffeine is analeptic (it stimulates the central nervous system) and ergogenic (it improves physical performance). It is also a diuretic, though recent



Savored like fine wine, high-quality teas stand ready for a tasting (above) at a Darjiling factory. Caffeine contributes briskness of flavor, which in lower quality or overinfused brews can easily deteriorate into bitterness.

psychoactive drug that raises blood pressure and thus increases the risk of heart disease.

But Jack James's view is out of sync with most public health pronouncements about caffeine. While the coffee and soft drink industries do finance some laboratory work on caffeine, there are also many independent investigators. And the consensus view seems to be that the world's

studies show that it is not dehydrating in moderate amounts, even in athletes, as has been widely believed. Caffeinated drinks do increase urine output, but only about the same as water. Caffeine boosts blood pressure, too, but this effect is temporary. And while some studies have shown that caffeine increases calcium loss, any effect is so small that it could be eliminated with as little as two tablespoons of milk a day.

Indeed much of the research suggests that caffeine may have benefits for human health. Studies have shown it can help relieve pain, thwart migraine headaches, reduce asthma symptoms, and elevate mood. As a mental stimulant, it increases alertness, cognition, and

reaction speed; because it combats fatigue, it improves performance on vigilance tasks like driving, flying, solving simple math problems, and data entry.

And despite its nearly universal use, caffeine has rarely been abused. “With caffeine, overuse tends to stop itself,” says Jack Bergman, a behavioral pharmacologist in the department of psychiatry at Harvard Medical School. “You get jittery and uncomfortable, and you don’t want to continue.” The point at which an individual reaches that jittery stage varies greatly. Some people seem to be genetically more susceptible to caffeine’s effects and may have increased anxiety after consuming even small amounts. In a minority of people, doses of 300 milligrams or more may prompt an increase in tension, anxiety, even panic attacks, which may account for why studies show that nervous people

Even for pregnant women, a population the Food and Drug Administration advises to avoid caffeine if possible, risks appear to be small, as long as daily intake is kept to moderate levels. Michael Bracken, a perinatal epidemiologist at the Yale School of Public Health, has tracked the habits of thousands of expectant mothers over the past two decades. “Based on current evidence, we can safely say to a pregnant woman, if you’re under 300 milligrams of caffeine per day—that’s about one to two cups of coffee—you’re not doing anything harmful to the child.”

After decades of testing, caffeine remains on the FDA’s list of food additives “generally recognized as safe.” “Looking at all the studies of caffeine, it is very hard to argue that moderate consumption is bad for you,” says Bergman. “The behavioral effects are real, but mild. It



generally have lower caffeine consumption.

As for caffeine use among children, it’s clear that their lower body weight means they should consume less than adults. Ireland’s Stimulant Drinks Committee report advised that consumption of high-caffeine beverages should be discouraged in children to prevent possible increases in anxiety or nervousness. But there’s no conclusive evidence about whether caffeine is harmful to children in small amounts. A report from the Australia New Zealand Food Authority concluded that children appear to metabolize caffeine more quickly, and that there was no reason to suspect that they are more sensitive to its effects—good or bad—than adults.

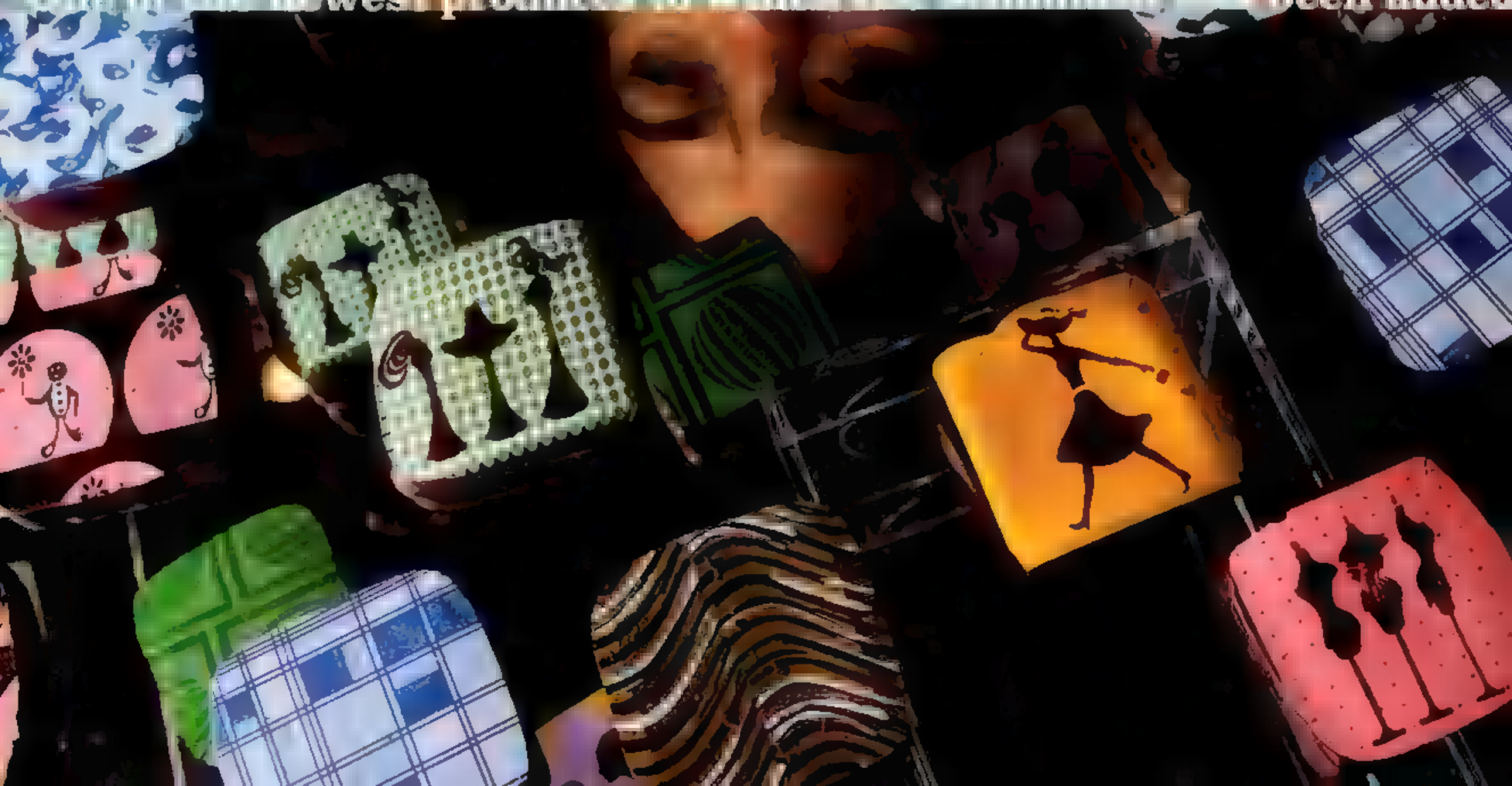
undoubtedly produces some physical dependence. I get up in the morning and usually have a couple cups of coffee. But when I don’t, the withdrawal symptoms aren’t severe.”

Some caffeine users might argue with Bergman: A day or so without caffeine can cause headaches, irritability, a lack of energy, and, of course, sleepiness. But compared with giving up cocaine or heroin, getting over caffeine is short and easy. Withdrawal symptoms tend to disappear in two to four days, though they can last up to a week or more. Still, the desire to avoid withdrawal pangs may explain why billions of humans so eagerly consume caffeine every day. The person who says, “I’m a monster until that



A consuming passion becomes an art form in chocolate boutiques from Sicily (top) to New York (bottom), where serious candy lovers line up for their favorite treats. These chocolate packs are not the caffeine of milk chocolate, but you'd have to eat more than half a pound to get the caffeine of one 12-ounce cup of coffee.

One of the newest products to which the stimulant has been added





first cup of coffee in the morning,” is describing a mild form of addiction.

In fact, Jack James contends that the widespread physical dependence on caffeine may have skewed research findings, exaggerating caffeine’s mood-boosting effects. If scientists compare two groups of subjects—some who have been given caffeine and others who have not—any improvement in mood or performance in the caffeinated group could be simply a relief from withdrawal symptoms. “It may be that we are all on one of those endless cycles,” agrees Derk-Jan Dijk, a physiologist at the University of Surrey’s sleep research center. “You take caffeine, and you are more alert. Then the next morning, the effect has worn off and you need more of the drug to restore the alertness. But maybe we could step off the cycle. For those of us who work during the day, we might do just as well without caffeine.”

On the other hand, that coffee ritual in the morning, maybe with your doughnut, is a normal part of life that we enjoy. It’s calming. It helps order the day. And all that can be useful for anybody. Over the centuries humans have created countless rituals to accompany consumption of their favorite drug. Often, the ritual has grown to transcend the beverage. In Japan’s austere elegant *chanoyu*, or tea ceremony, the simple surroundings of the tearoom, the soft rustle of kimono across tatami floor, the spare beauty of a hand-molded brown cup, matter as much as the tea itself.

The British have turned their afternoon ritual

Coffee rituals are panty hose with caffeine woven into their

into a pageant of pomp and luxury. In the glittering splendor of London’s Fortnum & Mason food emporium, afternoon tea is served amid green marble pillars and huge floral sprays, in fine china cups of gold and green. Obsequious waiters serve finger sandwiches, scones with clotted cream, and tropical fruit tarts with the Earl Grey or Lapsang Souchong. A pianist in the center of the room plays “On the Sunny Side of the Street”—just right, because you do indeed feel rich as Rockefeller, at least until the teapot runs dry and the check (\$44!) arrives.

Americans, true to form, have engineered a rather more casual set of caffeinated rituals: a cruller and coffee at the local Dunkin’ Donuts,



threads to supposedly help shrink thighs. >>> Vietnam is now

Like coffee growers every-
where, a Vietnamese farmer
(above) looks for the bright
red color that signals that
coffee "cherries" are ripe—
ready to pick and spread in
the sun to dry so the beans
inside can be removed. With
more than a million acres
of coffee under cultivation,
Vietnam ranks among the
world's top bean producers.



or instant with powdered creamer and Sweet'n Low at the desk. In the past decade or so, however, America's morning rite of caffeine consumption has moved decidedly upscale. A flood of new coffee shops has turned the 75-cent cup of perked joe, refills free, into a six-dollar extravaganza brewed and blended expressly for each customer by a personal barista.

"We have built a whole new ritual of coffee in this country," says Howard Schultz, the man who invented Starbucks. In two decades Schultz turned a single espresso bar in a coffee shop at the corner of Fourth and Spring in Seattle into a Fortune 500 company, building a global icon so familiar that *Playboy* has done a feature on the "Women of Starbucks." A five-cup-a-day coffee drinker himself, the 51-year-old Schultz is a picture of intensity as he prowls his office and recalls how it all began.

Schultz was a coffee bean salesman for a Seattle coffee bean store named Starbucks—after the first mate in Melville's *Moby Dick*—when he visited Milan in 1983 and fell in love with the ambience of that great Italian institution, the espresso bar. "It was about excellent coffee, but it was more than that," he says in passionate tones. "It was about conversation. About community. About human connection. And fine coffee was the link. I thought, You know, we could do this in Seattle."

On a drizzly (what else?) Seattle morning in April 1984, Schultz set up a tiny espresso bar in the rear corner of the coffee bean store, offering mysterious beverages like *caffè latte* that the likes of Dunkin' Donuts had never dreamed of.

the second largest producer of coffee worldwide, but it's largely a

Within days there were long lines on the sidewalk outside, and Howard Schultz never looked back. He soon left the company and opened his own espresso bar, called *Il Giornale*, or *The Daily*. Two years later he bought out his former employer, and now there are more than 8,500 Starbucks around the world, with another 1,500 scheduled to open this year.

Schultz doesn't like to emphasize the role caffeine may play in his company's success: "I don't think it's the caffeine. I think the ritual, the romance of the thing, is really more important."

But the caffeine is there. A few miles down the interstate from Schultz's office, at the Starbucks



Deftly poured steamed milk tops espresso with a leafy swirl in Turin, Italy. Aficionados call such flourishes latte art, and baristas from Iceland to El Salvador take pride in serving a little beauty with the buzz. "I drank this cappuccino," says photographer Bob Sacha, "and it tasted even better than it looks."

nation of tea drinkers. ☞ **Cigarette smoking nearly**

roasting plant in Kent, Washington, supervisor Tom Walters knows that firsthand. "I've been asked not to make the connection between coffee and caffeine," Walters says as he strolls past mountains of 70-kilogram burlap sacks holding fresh-picked beans from Colombia, Costa Rica, Nicaragua, Indonesia. "But we see a hell of a lot of caffeine around here. When you roast the beans, the caffeine forms a kind of fuzz on the roaster. So when we're too busy to get a coffee break, some people just run a finger down the casing of the roaster and lick it, and get their jolt that way."

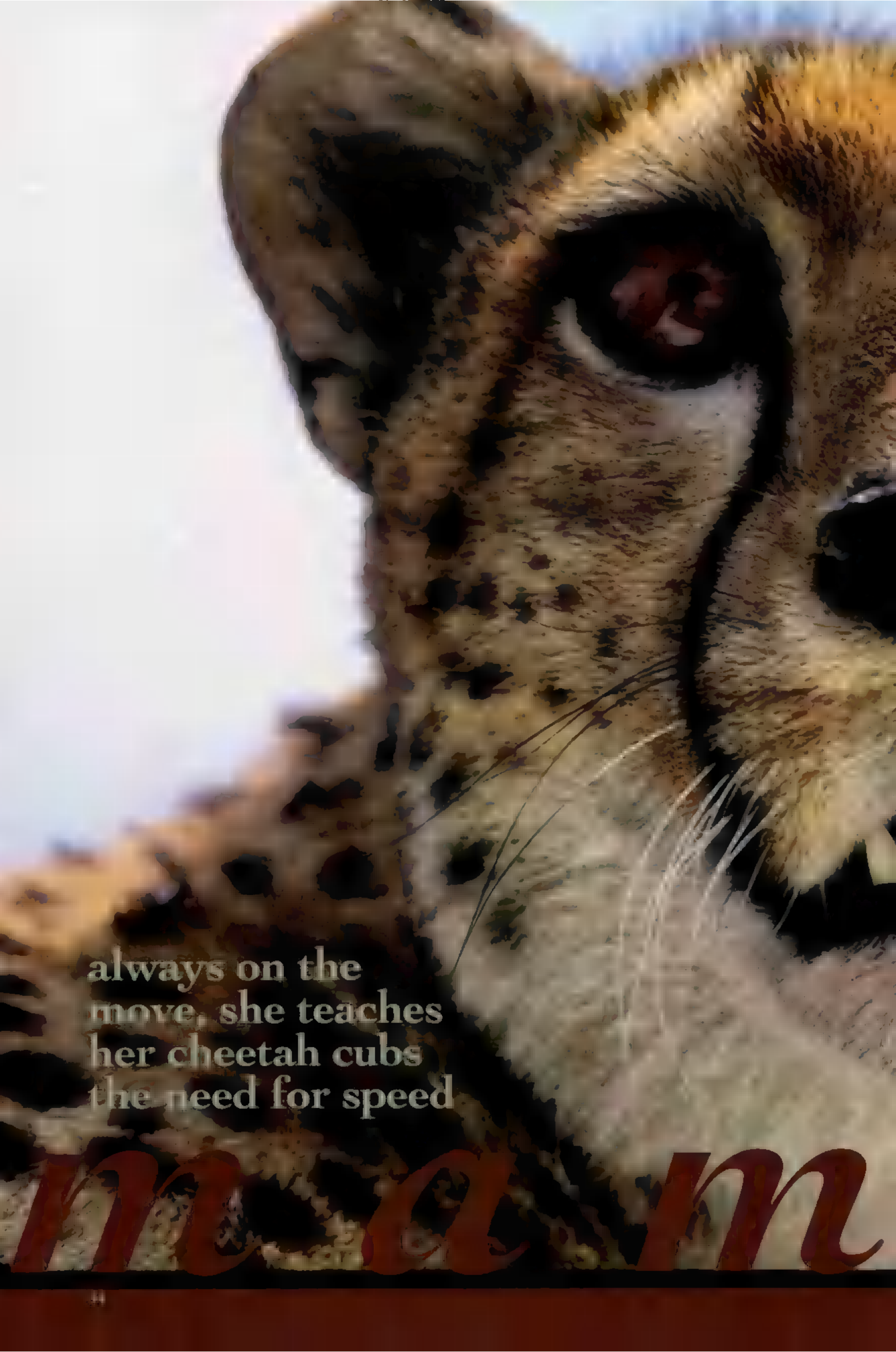
Getting that jolt, of course, is why many of the most popular beverages on Earth—coffee, cola, tea—just happen to contain caffeine. Whether it's a graduate student downing mocha in the lab or a monk sipping green tea while chanting in the temple, mankind's favorite stimulant is at work every day, all over the world.

And every night as well. Back amid the flashing lights and cascading noise of London's Egg, Lee Murphy is dancing now to the driving electronic beat of "Give It What You've Got!" He takes a long swig from one of his two cans of Red Bull. "Look, mate, I know it's a drug," he shouts over the din. "But I need that buzz." □

GET A BUZZ You'll almost taste and smell the coffee and chocolate as photographer Bob Sacha narrates the Sights ■ Sounds of caffeine ■ nationalgeographic.com/magazine/0501.

doubles the rate at which the body metabolizes caffeine.



A close-up, high-angle shot of a cheetah's face, focusing on its eye and whiskers. The cheetah's fur is a mix of tan and black spots. The background is a blurred savanna landscape under a bright sky. The text is overlaid on the lower-left portion of the image.

always on the
move, she teaches
her cheetah cubs
the need for speed

maam



a c a t





double trouble

A blur of spots and adrenaline, two cubs make Kenya's plains their playground. "Tag is their favorite game," says Anup Shah, who with his brother, Manoj, photographed three generations of cheetahs. For the first 18 months of their lives, these cubs depend on their mother (preceding pages). "I call her Amani," says Anup. "In Swahili, it means 'peace.' "



**you.
again?**

Bolder than his two sisters, a 14-month-old male cheetah stays put when the camera shutter clicks and captures a close-up. "He thought my car was a toy," says Anup, who's watched Amani's second litter of cubs since their birth. This cheetah and his sisters will eventually go separate ways. Male siblings often travel together for life, competing with other groups for territories and mates. Females roam wide ranges on their own—until they become mothers and have cubs tagging along.





by carol kaufmann NATIONAL GEOGRAPHIC WRITER
photographs by anup and manoj shah

quick getaway

How do you stay alive in a landscape filled with hunger predators, where lions or hyenas will kill your offspring, and jackals or vultures will steal your food? You keep moving. Binti, a new mother (left), gently nabs one of her ten-day-old cubs by the scruff of the neck. Although mother and cub are protected from human harm in Kenya's Maai Maai National Reserve, they must still combat a harsh world. Binti, whose name means "daughter" in Swahili, learned maternal skills from a peerless teacher—her mother, Amani. "Amani's practical, cool, efficient," says Anup Shah, who documented and named her growing family over three years.

That was her survival to Amani's faithful routine. At about six months Binti actively began learning how to hunt. So will her offspring. Cheetahs like a fresh kill and will pursue and catch their prey. Cubs are good observers, watching their mother whether she's searching for prey, harassing her claim, or walking potential dinner.

When the family needs to eat, Amani climbs atop a nearby termite mound to survey the undulating plain. A Thomson's gazelle has escaped from its herd. Amani focuses her amber eyes. The gazelle continues to graze. Amani crouches, shoulders hunched, rump flat back, frozen. A few steps propel her into a run. Her speed builds, and within seconds she reaches full sprint. She sails across the savanna, often a rhythmic symphony of speed and grace.

But the gazelle has a head start. Clocking speed nearly as fast as the cheetah's 60-plus miles an hour, the gazelle makes quick turns intended to throw Amani off. Despite being the world's fastest land animal, a cheetah snags such prey only about half the time. This is one of the good times. Amani trips the gazelle with an outstretched paw. With one last bleat, the gazelle goes down. Amani goes for the throat, her bite



suffocating the prize. Over the next several months the sharp-eyed cubs will try to emulate Amani's behavior—and fail miserably, mainly because their prey notices their awkward approaches. So mother makes them practice, over and over.

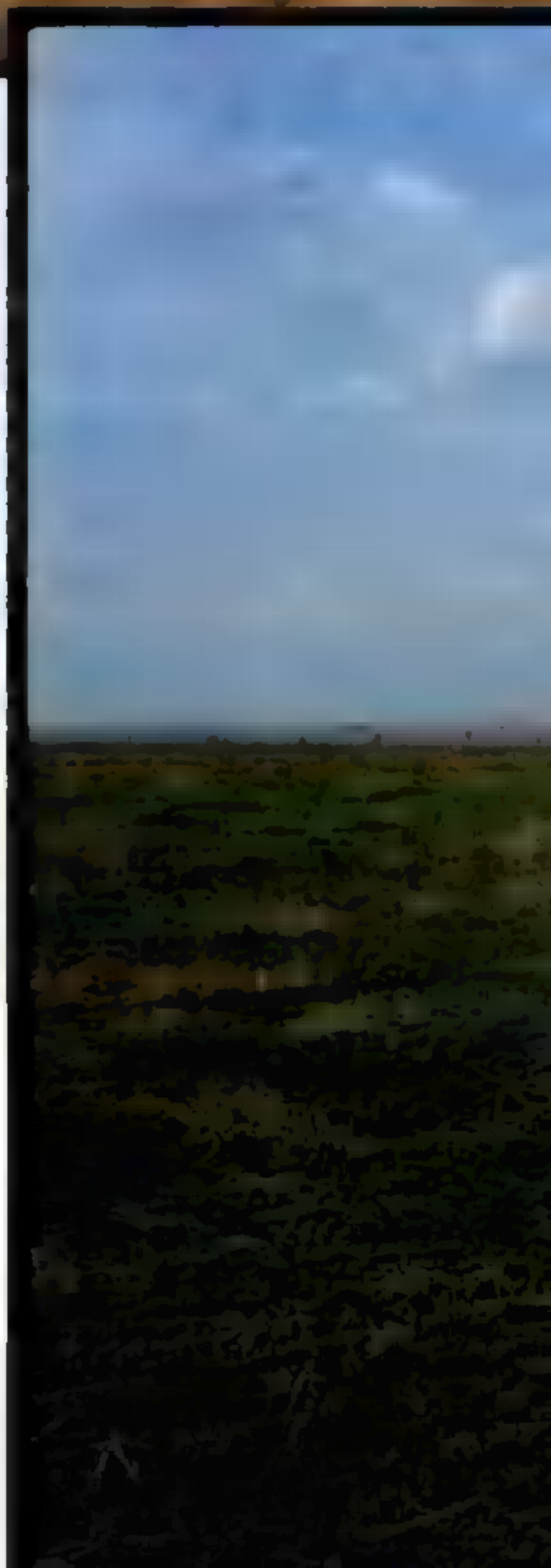
“Successful mothers seem to produce really successful cubs,” says Marcella Kelly, a professor at Virginia Polytechnic Institute and State University who has tracked female cheetah lineages for up to eight generations. “They’re nervous, excitable, vigilant.

In the wild they need to be jumpy. Cubs most likely pick up these traits.”

Once young cheetahs are on their own, it can take months for them to become skilled hunters. Some adolescent cheetahs start out hunting impossible prey, including buffalo. Those who learn from their mistakes survive. Among Amani's successes is her daughter: Binti had her five cubs in the same area where Amani gave birth to her.



RUN WITH CHEETAHS Capture the boundless grace of the world's fastest land mammal and download desktop wallpaper of cheetahs—the ultimate cat. Then browse our photo gallery, get tips from the photographers, and find a listing of related websites and other cheetah resources at nationalgeographic.com/magazine/0501.





built for speed

A cheetah cub begins sprints young. When fully grown, its long-legged body and semi-retractable claws, which act like cleats, will enable it to cover about 25 feet in a single stride. Large nostrils, lungs, and heart combine to give cheetahs plenty of oxygen for bursts of acceleration. Dark tearstain patterns may reduce glare.

“The cubs’ energy is boundless,” says Anup. “When the family is on the move, cubs often run ahead of mom and then wait. When they’re finally spent of energy, they’ll walk behind her.” After suckling her cubs in her lair, Binti (below) scans the horizon for her family’s next meal. Despite their speed, cheetahs hunt by stalking prey until they are fairly close; their swift chases rarely last more than 20 seconds. The less fanfare the better, for other predators are always watching.





hunting practice

Cubs from Amant's second litter attempt to bring down a gazelle that their mom has already wounded and weakened. But instead of tripping the gazelle with a paw, the beginners merely nip at its tail. Cheetah mothers are known for training their young by releasing prey that they've injured but haven't yet killed.



dinner hour

While Amant, at top, and her cubs dine on game, one cub looks for passing threats. Once a kill is down, Amant usually tears open its tender rump, calls her cubs to the feeding ground, then scouts about for a tree's shade. The high-speed chase for dinner overheats Amant, who sometimes needs a half hour's rest before eating.

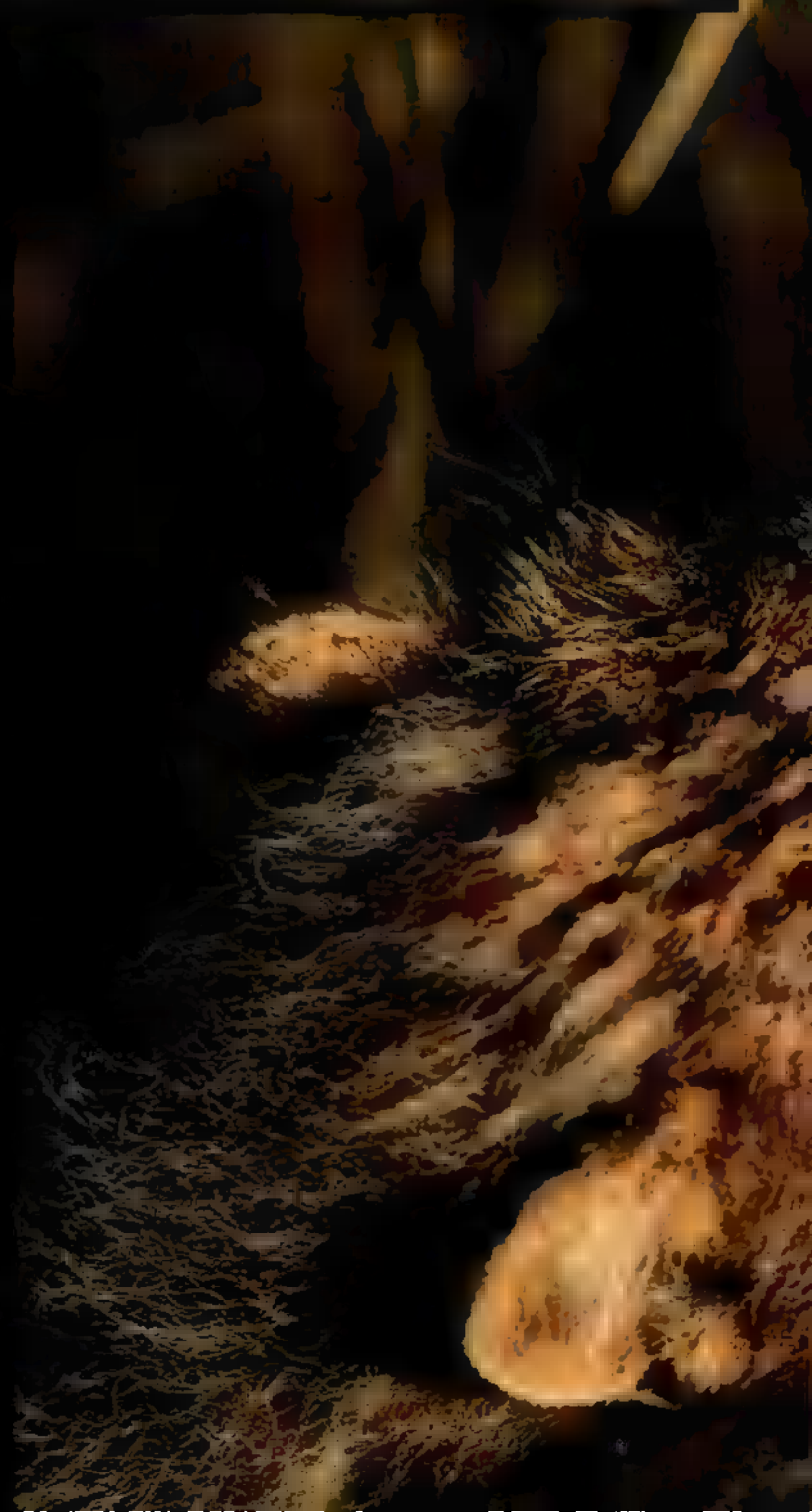




mother nurture

Big wet kisses and social grooming reinforce the mother-cub bond, as well as clean the cubs of flies and ticks. Females protect her young from danger, Binti forms lairs in tall grass each day for her newborns (above right). The smoky gray mantle the tiny cubs wear blends in with the dry grass. Warm and snug, close body contact with their mother provides reassurance and security the cubs seek.

Less than two weeks old, Binti's five cubs (above) chirp like birds when mom leaves away, beckoning her back. She responds with a similar chirp as she approaches. Cubs are born without teeth and are unable to see or walk for about a week. But learning to walk is no guarantee of safety: Until they're five months old, they won't be fast enough to escape a lion or spotted hyena. Only about 25 percent of cheetah cubs on East Africa's plains ever reach adulthood, let alone live out a full life span, which can extend 14 years but averages seven. Of Amani's first litter of four, only Binti survived.





alone again

Cheetah motherhood is a solitary job. Males appear briefly for mating but play no role in rearing the young. After 10 months, Amani moves to a new part of her roughly 300-square-mile range, leaving behind some very confused and distressed offspring. But it's for their own good, and here: As long as she is mothering them, they will not mate, and her legacy will suffer. So Amani will return to life on the savanna, searching for another mate and tall grass where new cheetahs can learn to run. **R**





By ERLA ZWINGLE

Photographs by
O. LOUIS MAZZATENTA

ITALY BEFORE THE ROMANS





A MASSIVE PYRE of grapevines awaits ignition on the eve of the feast of Sant' Antonio Abate in Novoli. An annual Catholic rite celebrated along the Adriatic coast, the bonfire's pre-Christian roots reach back to groups known as the Italic peoples, who thrived on the Italian peninsula long before the Romans began to dominate in the fourth century B.C. These cultures—Apulians, Umbrians, Samnites, and others—had distinct languages, art, customs, and weaponry, including heart-protecting armor such as this bronze disk from the sixth century B.C. (above), adorned with a mythical beast. Now reexamining their pre-Roman past, Italians are discovering the rich Italic inheritance that still resonates today.

MUSEO ARCHEOLOGICO NAZIONALE D'ABRUZZO, CHieti (DISK, ABOVE, AND VESTIMI STATUE, FOLLOWING PAGE); ALL ARTIFACTS PHOTOGRAPHED BY O. LOUIS MAZZATENTA WITH PERMISSION OF THE MINISTRY OF CULTURAL AFFAIRS.





SNAKES LEND pagan flair to a Christian saint at the feast of San Domenico Abate in Cocullo. Here, each May, citizens and thousands of visitors crowd to touch a statue of the town's patron saint. The rite hints of the Marsian people, famed for snake handling and herbal remedies. Another Italic touchstone, the "Warrior of Castrano" (far left)—a sixth-century B.C. king of the Vestini people—now appears on wine labels.

DAVID ALAN HENRY

HE CAME TO HER in a dream, a sad, beautiful Samnite boy who had lost his way home. “It was on a hill I know, but without any vegetation,” Teresa Cerlone remembered, “and he was wandering back and forth in a world that wasn’t his. He was looking for a door, not to a house but to a world. And there was a spring of water, I remember. There

was an entrance with two columns with a tall staircase, like the temple at Pietrabbondante,” she continued, speaking quietly but with intensity. “We went under the columns, and he asked me, ‘Help me find my way.’ He took my hand, and I felt that he was flesh and blood. Then he disappeared, but he left his hand in mine. It wasn’t human anymore; it was made of terracotta. And I woke up, sweating.”

When it was light, Cerlone went immediately to the hillside she had dreamed about. She’s not an archaeologist, but she is passionate about the Samnites, the fierce people who once dominated the mountains of Abruzzi and Molise not far from her home in Isernia. Where she had dreamed the spring was located, she began to dig in the loamy earth. Suddenly she touched something hard. She pulled it out. It was a piece of terracotta. It was a hand.

Discoveries just as exciting, though perhaps not quite as eerie, are bringing to light extraordinary new aspects of the peoples who lived in Italy before the Romans became its masters. In the Iron Age, around the ninth century B.C., when the Romans were merely a smallish farming tribe living in huts near the Tiber, Italy was teeming with distinctive cultures, languages, and works of art and craft. In fact, until the fourth century B.C. the Romans weren’t the ones you’d have picked as most likely to conquer the Western world. The smart money would have been on the Etruscans—or on the Samnites.



MUSEO ARCHEOLOGICO DI BENEVENTO (ABOVE); DAVID ALAN HARVEY

Generally referred to as the Italic peoples, the ethnic groups of pre-Roman Italy tended to live in temporary settlements rather than towns, cultivating small plots, herding their sheep and cattle, trading with foreign merchants, and skirmishing with their neighbors. Living in a world where divinities spoke through

bird flight and thunder, they created small masterpieces of ceramic and metal, honored trinities of gods with trinities of animal sacrifices, and sought to the end—in spectacular battles and complicated treaties—some way to manage the relentless expansion of the Romans. By the first century B.C., though, the last traces of their political autonomy had been surrendered to the Roman Empire.

While the Etruscans are the most famous of the myriad cultures of pre-Roman Italy, three other groups deserve greater credit than they may have gotten till now: the Faliscans (think of them as the accommodators), the Samnites (the warriors), and the Umbrians (the worshippers). Just as the soil of Italy today is rich in their tombs and terra-cottas, the culture of Italy today is equally rich in words and customs drawn from these pre-Roman peoples—their ideas, their ingenuity, and their piety, a multitude of elements which till now had been thought to originate with the Romans, but which it turns out they had merely adopted.

These early Italians spoke languages descended from a mother tongue called Sabellic and

The faithful in Cocullo take turns caressing harmless serpents at the feast honoring San Domenico Abate, a healer believed to defend against maladies. The Samnite people enlisted more earthly defenses. Armed with an ax, shield, and three-disk corselet, a Samnite warrior does battle on a fourth-century B.C. vase (above). Known for their military prowess, Samnites were among the last holdouts against Roman expansion.



written in scripts modeled on the Greek, Latin, or Etruscan alphabets. One of the offshoots, Oscan, was once more widely spoken in Italy than Latin. The Samnites spoke Oscan, probably as distinct from the Umbrian language as Spanish is from Italian. Faliscans discussed the weather in a tongue very similar to Latin. Artifacts obviously tell us a great deal about their makers, but the several hundred Oscan and other words that survive in inscriptions tell just as much—even more, in a way, because they echo the voices of the men and women who spoke them. In their words we can hear them, suddenly alive, their shouts of rage, murmurs of love, laughing children and weeping women. *Maatir*—mother; *puklum*—son.

The Roman custom of giving a first and last name may have come from an Italic group called the Sabines. Gladiatorial combat was a funeral custom that probably originated with the Etruscans and was adopted by the Romans, who eventually saw its potential for entertainment. The name “Italy” itself is derived from an ancient Sabellic word that originally labeled only the southern toe of the peninsula.

“The regionalism that is still so strong today in Italy originally stems from the differences between all these groups,” says professor Nicola Terrenato. “They are our cultural roots.”

Every May 15 the town of Gubbio in the modern-day region of Umbria offers a sacrifice to Sant’ Ubaldo, its patron and protector. The festival, called the *Corsa dei Ceri*, is a race that honors the saint through the suffering of its participants rather than with the slaughtered animals that once were offered to his pagan predecessors. This race is Gubbio’s defining moment.

Three groups of 20 men (with frequent reinforcements), each dedicated respectively to Sant’ Ubaldo, San Giorgio, and Sant’ Antonio Abate, run through the narrow, stony streets of the

town and a mile and a quarter up the mountainside to the basilica, carrying on their shoulders a wooden platform topped with a towering wooden pillar called a *cero* (plural *ceri*, in Italian). Each *cero* is dedicated to a saint and each weighs some 600 pounds.

“It’s an emotional thing, not a rational thing,” said Lucio Baldelli, a recent leader of the Sant’ Ubaldo contingent. “It’s a rite, and that’s what makes it live.” No mere remnant of costumed folklore, but something more like an explosion—the sweating men are crying, swearing, their faces white, their eyes staring at nothing—the *Corsa dei Ceri* is a richly symbolic custom with ineradicable links to ancient Umbrian worship.

Why a giant pillar of wood? Why pour water onto it, and why run with it three times counterclockwise around a well and a flagpole? And why follow that particular path through the town and up the mountain? These and many other elements reflect rituals inscribed in Umbrian, the language of the original Umbrians, on a series of seven bronze tablets called the Iguvine Tables, which date from about 300 to 90 B.C.

“The water and the counterclockwise circles are drawn from the ceremony of the purification of the army,” said Augusto Ancillotti, a professor of linguistics at the University of Perugia and an expert on the ancient Umbrians, especially their language. Because killing renders the killer ritually impure, the priest had to perform a cleansing rite. “They do it three times because three is the perfect number, a magic number,” Ancillotti said.

The route the runners take around the city draws on another ceremony, also described on the tablets, which ensured the ritual protection of the city. The priests were required to walk the circuit of the city walls, stopping to sacrifice animals—oxen and pregnant sows—behind and before each of the three city gates. The path the runners take today retraces the earlier city walls, and the three places where they pause, Ancillotti maintains, are the



IRON AGE

753
Traditional date of
the founding of Rome

616-509
Etruscan kings
rule Rome

509
Roman Republic founded;
Etruscan monarchy falls

900 B.C.

800

700

500

500

Earliest evidence of
distinct ethnic groups
in Italy

800-400
Formation of independent
Italic city-states

PERIOD OF RICHEST ITALIC
BURIAL GOODS

500-400
Etruscans found colonies
in Po River Plain



ITALY'S EARLY ETHNIC FACE

Italic peoples began to develop distinct identities about 900 B.C. Though the Etruscans (not considered Italic because of their language) rose to early prominence, a wealth of Italic cultures also left their mark. Mingling with them, Greek colonies thrived in the south, and Celtic peoples, such as Gauls, came from the north as both warriors and settlers. In a final effort to assert autonomy against Rome's imperial vision, several groups formed a league in the early first century B.C., using the name Italia for their union and currency (opposite).

circa 390 Gauls loot Rome	SAMNITE WARS AGAINST ROMAN EXPANSION	Battle of Sentinum: Rome defeats Samnite alliance (295)	Italic League founded; fights Rome in Social War (91-87)
396 Veii (Etruscan) is first city-state annexed by Rome	ROME ESTABLISHES COLONIES IN ITALY	Rome rules peninsula and beyond; grants Italic peoples citizenship (90)	27 B.C. Augustus becomes first Emperor of Rome



EMERALD SLOPES near Matelica once cradled the ancient Picenians. Settling close to the Adriatic, they prospered by trading with Greeks and Phoenicians, and imported prized amber from the Baltic. Higher in the Apennines—Italy's mountainous spine (in background)—the



Samnites, Marsians, and other Italics found security among steep slopes that frustrated roving invaders and Romans unschooled, at first, in mountain warfare. During winter they brought their sheep and cattle into the lowlands, a place of exchange for goods and ideas.



ARISTOCRATS
all groups vied for status by wearing gold. The women buried with these pieces in the fourth and third centuries B.C. were Celts in the Adriatic region of the Marche. Greek goddess Athena gazes



from a ring (left); earrings (below) bear Near Eastern motifs; Celtic collar, or torque, was also worn by men. Etruscans popularized a pendant called a bulla (bottom, flanked by golden acorns).

MUSEO ARCHEOLOGICO NAZIONALE DELLE MARCHE, ANCONA (ALL)



THEIR DIVINITIES SPOKE THROUGH



locations of those three ancient gates, though only one, the Porta Veia, still exists. Even having three groups, each dedicated to a saint, reflects the fact that the final sacrifices were made to three gods at their temple up on the mountain where the basilica of Sant' Ubaldo stands today.

Animal sacrifices were banned when Christianity arrived in Umbria in the fourth century A.D., so, according to one account, the people of Gubbio substituted the wooden *ceri*. They used colored wax (*cera*, in Italian) to decorate it with whorls representing leafy fronds, symbols of fertility. Each *cero* was borne on a heavy wooden platform just like the one that bore the original sacrificial animal. Though designed to not offend the church, the hollow wooden pillar clearly recalls the equally pagan maypole, a fertility totem once commonly venerated in spring.

I missed the start of the race because I wanted to see the end, and the men run so fast and the throng is so huge that it's impossible to see the entire run. So as the roar of the crowd below told me the race had begun, I was trudging with clumps of other people in the early evening heat up the steep, dusty road and its eight hairpin turns toward the mountainside basilica. Waiting by the church's entrance, I watched the crowd around me grow to several thousand. Then the roar was upon us.

Up the last steep stretch came the three *ceri*, carried at a dead run, swaying, each one haloed by the clouds of glowing sunset dust that seemed to be clouds of incense, or the cloud of an approaching army. Everyone in the crowd was

yelling the name of their saint as the three teams lumbered up the steps, paused, then toppled the *ceri* forward so the men could carry them under the main portico, three times around the well inside the portico, and then into the church itself. The crowd crushed together to follow them in. Every man who could reach the *ceri* pounded on them with their open palms, making a deep hollow thudding. I was astonished to feel tears spill from my eyes. It was overwhelming.

Inside the church a service was under way. People were shuffling past the *ceri*, touching them and then kissing their fingertips; a dark-haired girl leaned back against the wall, hands pressed together, praying, her flushed cheeks streaked with tears. What the people were feeling wasn't hysteria, it was something bigger: It was the spirit of their ancestors who had carried the animals up the mountain to be slain. Now they offered their pain, and a belief so deep it went beyond worship.

The *Corsa dei Ceri* is an accumulation of past ideas, practices, even lives. "You never eliminate a stratum," linguist Augusto Ancillotti said. "You absorb it." As he explained it, the study of language is also a kind of archaeology. Each word is a tiny window into the character of its people, as vital to understanding them as any tool or weapon. "There's a whole picture tied to names and words, and we're trying to reconstruct a world by means of words. We're not dealing with a rustic, provincial people, as the Romans claimed they were."

The ancient Umbrians "had respect for the

BIRD FLIGHT AND THUNDER



Ancient practices to counter evil still live in modern Italy. At her home in Spinete, Elena Salvatore (in black) has just dropped olive oil in water and seen the droplets break up—a sign to her that the malocchio, or evil eye, burdens her visitor (the photographer's interpreter). To banish the evil, Salvatore performs a purification ritual. She makes the sign of the cross, recites prayers, and repeats: "Eye against eye and God against them, take away the evil eye."



SPIRITED FERTILITY RITES

WHIPS SNAP as young women eagerly bare their shoulders for a touch of the lash, believed to bestow fertility. A priest offers prayers at an altar near the *Lapis Niger*, a sacred site paved in black stone that survives today in the Roman Forum. In the sixth century B.C., residents of early Rome—part of the Italic group called the *Latins*—purified the community by honoring gods with



ART BY JON FOSTER

the ritual of Lupercalia. First priests sacrificed goats and a dog at the Lupercal, the cave where legend claims a she-wolf suckled Romulus and Remus, the mythical founders of Rome. Then they smeared the goats' blood on two youths, shown here flailing at the crowd. Held February 15, the Lupercalia remained an important Roman festival until banned by the pope in A.D. 494.



STRUNG on bronze wire, seven bone figures of nude men and clothed women hang from a pectoral worn by a Picenian in the sixth century B.C. The smiling figures recall Greek sculpture of the time, but whether they were imported



or copied locally is not known. Italics admired and emulated Greek culture: A sixth-century B.C. ivory centaur and rider (left) comes from a Picenian burial. Hercules, protector of shepherds and travelers, ranked among their favorite gods.

THEY CREATED SMALL MASTERPIECES

CARVED of cow and sheep bone, the mask of a divinity, possibly Dionysus, decorated the funerary bed of a Vestini woman. Sometime between 300 and 100 B.C. she was buried at Fossano, one of Italy's oldest and largest necropolises (far right). Discovered in 1992, the well-preserved site holds several thousand Vestini graves dating from the tenth to first centuries B.C., a trove of Italic burial styles. At many male graves, vertical stone slabs—perhaps aligned with the setting sun—lead in descending height to a stone-encircled grave mound. Before the fourth century B.C., ground burials distinguished tribes east of the Apennines from their western neighbors, who cremated their dead.



word as sacred," he continued. "There was even a god, Giove Sancio, Jove the Ratifier, who ruled the given word.

"Italian today is full of Umbrian," he went on. "Latin has five vowels; Umbrian had seven, and Italian today has seven, though we only write five. Writing we learned from Latin, but speaking we learned from Umbrian. Italian is full of the Umbrian sounds."

Several Italic cultures adopted birds as their totems—the woodpecker, the duck—and the Umbrians were famous for seeking signs of divine will in the flight patterns of birds, a practice the Romans took up. The Gubbio phone book today is a trove of avian surnames: Galli (roosters), Piccioni (pigeons), Passeri (sparrows), Fagiani (pheasants), Merli (blackbirds), Picchi (woodpeckers). Birdsong and battle cries still echo through Umbria, on the day the men of Gubbio struggle up the hillside to present their sacrifice at the altar.

By the fourth century B.C. many of the Italic people had begun to succumb to the expansionist pressures exerted by the shrewd, opportunistic Romans, and commercial routes began to shift westward toward Rome. But the Samnites, who lived among the remote upland valleys and craggy heights of deepest Abruzzi and Molise, grimly resisted. Needing more space for their immense

flocks of sheep and tempted by the fertile western lowlands bordering the Tyrrhenian Sea, they had already begun to expand, moving dangerously closer to Rome itself. Eventually it became clear that the struggle to dominate central Italy had narrowed down to two contenders, Samnites and Romans.

"The Samnites were so powerful that they conquered cities like Pompeii in the fourth century B.C.," said professor Emmanuele Curti. "Even if we do know Pompeii as a Roman town, the main infrastructure of the city had already been created by the Etruscans, and the Samnites rebuilt it. New excavations have revealed beautifully decorated houses belonging to the Samnites."

Curti is now working on a dig in an area facing what may have been Pompeii's harbor and has discovered the remains of a Samnite temple, perhaps dedicated to Mefitis, the Samnite goddess of fertility. It lies beneath what is believed to have been the Roman temple of Venus, built by Sulla, the general who finally crushed the Samnites. To Curti, though, the fascination lies in the fact that Pompeii provides archaeological evidence of a city conquered by the Samnites where they adapted to living in a city system.

All the Italic people were skilled in warfare, but the Samnite men were legendary even in their day, guerrilla fighters capable of sudden attacks so violent that their enemy had no time to organize an effective resistance, and Samnites were

AND HONORED TRINITIES OF GODS



determined to die rather than surrender. They were so cunning and courageous that it took three Samnite Wars over a period of 50 years (343–290 B.C.) for the Romans to bring them to heel.

Davide Monaco, an architect in Isernia, is also an amateur archaeologist. His Samnite ancestors are his personal passion, and he has even designed a website dedicated to every aspect of their culture. One spring weekend we drove around most of their ancient realm, what was once called Samnium, along endless twisting mountain roads that all began to seem the same—probably the very sensation the frustrated Roman legions had felt.

“The Samnites have been portrayed as rough people,” Monaco was saying as he downshifted around another sharp turn, “because the Romans had a powerful need to destroy them. We’ve

The historian Livy records 8,700 casualties in the Roman force of 36,000. The size of the opposing army isn’t clear, but it’s estimated that 25,000 died. “It was a slaughter,” Monaco said. “And the Romans won.” The peninsula was theirs to rule.

Sentinum is one of history’s great what-ifs—especially what if the Umbrians and the Etruscans hadn’t been diverted by Roman troops before they could reach the decisive battle.

Because Samnites conquered cities rather than build their own, there are no pure Samnite cities to excavate. What they did construct were strong stone enclosures on steep mountainsides, where the clans would seek refuge in times of strife. Forests have long since covered many of these forts, and only now are they, and their wealth of information, being explored. But a thrilling

“IT’S AN EMOTIONAL THING, NOT

heard that General Sheridan said that the only good Indian was a dead Indian, but it was the Roman general Lucius Cornelius Sulla who said it first, about the Samnites.

“But the Samnites taught the Romans a lot about how to fight,” Monaco went on. The Samnites used a checkerboard formation, which was ideal for mountainous terrain; their weapons were short stabbing swords, spears, and round shields. Some experts surmise that after the first disastrous encounters, the Romans switched from their standard phalanx formation, which was no good on hills, and adopted both the checkerboard formation and the weapons.

“To fight the Samnites, imagine how many deaths there were!” Monaco marveled. “In every battle there were 5,000, 10,000 dead, because the Samnites fought to the end.”

Eventually generations on both sides had lived through battles, scorched fields, negotiations, treaties; the Samnites had even occasionally allied themselves with Rome, seeking advantage in some other cause. By 295 B.C. the Samnites decided to make a final stand for total independence.

They organized a massive league of rebellious factions among the Gauls, Etruscans, Umbrians, and lesser groups, and met the Romans on the field at Sentinum, near today’s Sassoferrato in the Marches. “Imagine the scene,” Monaco said, “everybody against Rome.”

Impassioned madness hits the streets of Gubbio every May 15, when a grueling race called the Corsa dei Ceri honors the town’s patron saint, Ubaldo, and its Umbrian heritage. During the race three teams of men heave 600-pound wooden pillars, or ceri, through medieval streets past cheering throngs. The final push takes the teams up steep mountain switchbacks, slightly more than a mile to the Basilica of Sant’ Ubaldo. Fueled by their fervor, the men run it in about ten minutes.

DAVID ALAN HARVEY



glimpse of Samnite life can be seen on a windy height at Pietrabbondante: the remains of the largest Samnite temple and theater ever found.

We don't know what the Samnites called this site—the Romans destroyed even their names—but we know it was one of their primary clan meeting places, where they elected senators and commanders and offered sacrifices. Thirty years ago Adriano La Regina, now superintendent of archaeology of Rome, began digging under a wheat field and brought this sanctuary to light.

We stood on the temple's broad platform, 120 feet long and nearly 80 feet wide, with its central staircase cut into the podium in the unique Italic style. Beyond the broad terrace of land strewn with the outlines of former small buildings, the spacious uplands rolled toward the horizon—the heart of the Samnite domain. "Before we had

this site," La Regina said in his calm, courtly way, "we knew almost nothing about Samnite culture, because we only had the Roman and Greek sources who wrote about them."

The theater below, with its semicircle of stone seats, had the distinctive Italic stone backs, neatly curved with a sort of lumbar support. What was the theater for? "We know that the Samnites had their own literature, their own comedies," La Regina told me. "They were very broad, very popular burlesques called *atellanae*." (The pitiless Samnites, laughing?) "And they certainly discussed political questions here. This theater dates from the end of the second century B.C., so the meetings would have been to discuss the situation that led to the rebellion against Rome."

By 91 B.C. the Samnites had decided to attempt to gain their own political voice in the new

A RATIONAL THING"





CROWDS SWELL and roar at the start of Gubbio's Corsa dei Ceri, when teams clad in blue, yellow, and black hoist the 16-foot ceri topped by saints Giorgio, Ubaldo, and Antonio, respectively. In pre-Christian times Umbrians are said to have carried animals on platforms



to sacrifice on the mountaintop where the basilica now stands. Today Umbrians offer their sweat. "It's more important than any soccer game," says Mirko Monarchi of the yellow team. "If you were to take it away from Gubbio, there would be very little left."

regime. Along with other Italics, they formed an alliance, the Italic League, to fight for the full rights of Roman citizenship. Their uprising, called the Social War, showed how much tenacity and passion Samnites were still capable of.

What were the Samnites really like? I asked La Regina. "Livy wrote about their courage," he replied, "and their desire for liberty: 'They prefer to die rather than become slaves.'" La Regina has touched the Samnites perhaps more closely than any other scholar. What does he think would strike them most about the culture of their homeland today? He paused and thought. "The commercialization of everything," he answered, "that everything can be bought and sold. Do we attribute great value today to honesty, to virtue?" His answer was a small, ironic smile.

Vast white clouds boiled up behind the stony peaks and shadows stained the grass. The fierce Samnite dead had eventually won Roman citizenship for their people, a benefit which then buried them in history. But something in us still wants them to be alive.

In the softer, more comfortable lands closer to Rome, the hot breath of war cooled to more reasonable discussions of mutual profit. It's true that the Italic peoples had habitually argued among themselves—friends one day, enemies the next—but these encounters were more like stone-throwing episodes,

attached to it. What we were looking at as we crashed around in the dry undergrowth, swatting at all kinds of zooming insects, were traces of that town—Falerii Novi, or "new Falerii."

Walls loomed up among the trees, massive blocks of the local soft reddish-brown volcanic tuff built literally onto the small cliffs above a slim river. These walls form a circumference of one and a half miles, and the remains of about half the original 80 towers are still visible, sort of, among the trees. Some of these towers reached nearly 60 feet high. But the rest of the town is under farmland, fields, and pasture.

Terrenato now teaches at the University of North Carolina, but he has been coming here since the late seventies when he was a high-school volunteer eager to help weed. Although we know maddeningly little about the Faliscans, Terrenato believes they understood that cooperating with Rome would help them prosper.

History books have traditionally held that the Romans sacked Falerii Veteres in 241 B.C. and deported the Faliscans to this spot, but Terrenato's research leads him to believe the events were not so violent. "What my colleagues and I are thinking now is that the new town was more a joint effort between the Faliscans and the Romans," he said, plucking at bits of invading roots. "Falerii Novi is straddling a new trunk road, and while the Romans are in charge of building the road, it's clear that the Faliscans

"IMAGINE THE SCENE: EVERYONE

as one expert put it, than outright war. Nicola Terrenato, a young professor of classics and archaeology, believes that many smaller groups began to discern more advantages than drawbacks in allying themselves with the growing power of Rome. The Faliscans may have been one.

One hot May morning I joined Terrenato to go bushwhacking through the forest overgrowing what once was an entire city some 25 miles north of Rome. This is the heart of Etruscan territory, but the Faliscans had carved out their own little enclave in a fortified hill town they called Falerii Veteres, now Civita Castellana.

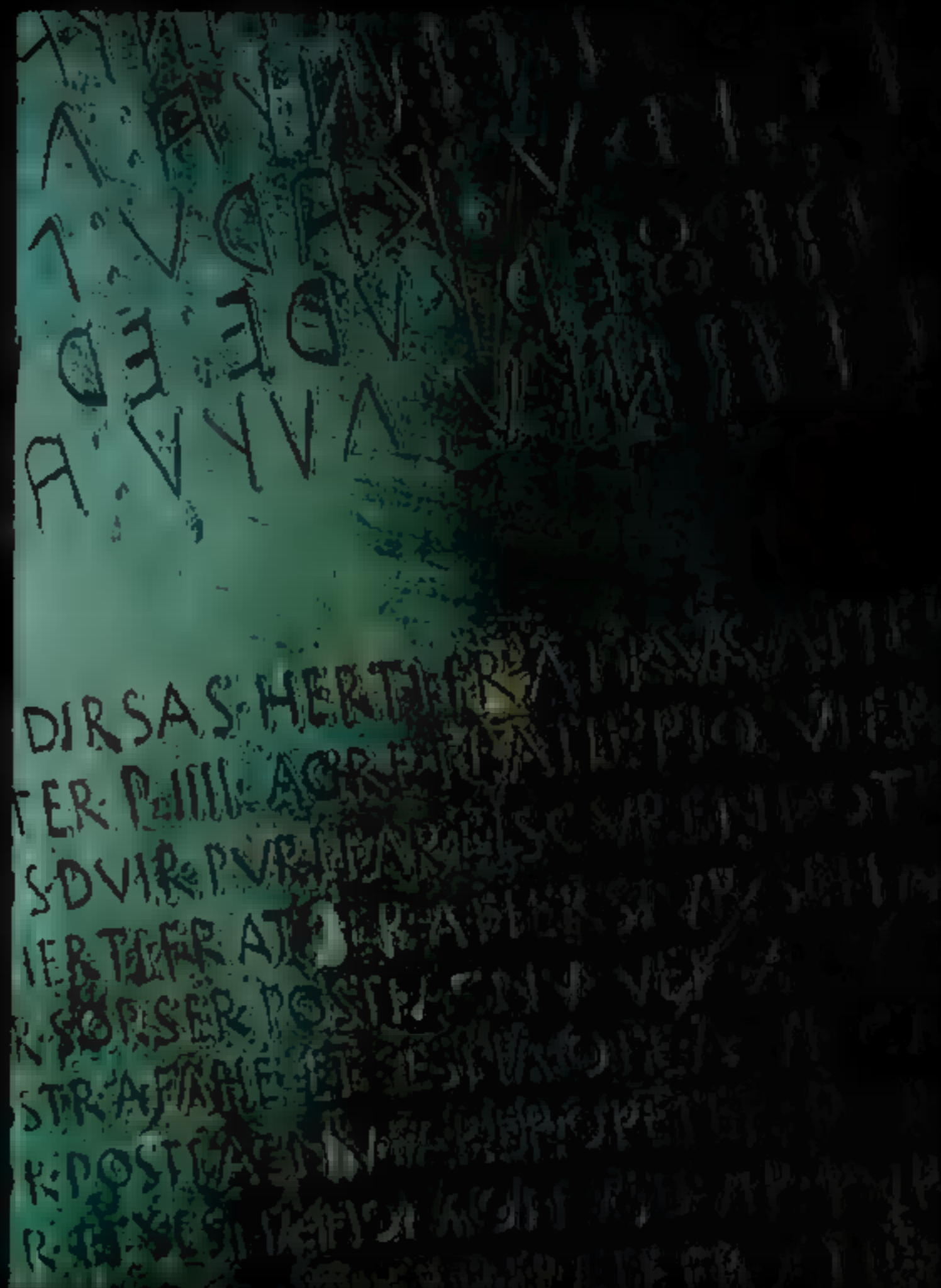
In 241 B.C. they relocated the town down on the plains. Rome was building a new north-south road, the Via Amerina, and there were benefits to both peoples in having a town

are in charge of building the new city.

"I think this is one of the keys to understanding the role of the non-Roman populations. They weren't always defeated by Rome, but instead there was often a lot of cooperation. There was that Roman ability to integrate people who were allowed to go on doing their thing." Falerii Novi became a full Roman city in 90 B.C., and its people, still Faliscan, became Roman citizens. But by the sixth century A.D., facing the barbarian incursions, the city was abandoned.

We walked under the sole remaining archway, the Gate of Jove, a solid tuff entrance that has been guarding this way into the city since the third century B.C. "In 1998 we came up with a plan of the city," Terrenato said, "using magnetic devices to outline what is underground. Where

WINDOW on Italic thought, seven famous bronze engravings, called the Iguvine Tables, describe Umbrian rituals—including ones that may be reflected in the Corsa dei Ceri—that were practiced by the residents of Iguvium, today's Gubbio, between the third and first centuries B.C. The tablets were written in the Umbrian language, first using an alphabet derived from the Etruscans' (right, at top) and later inscribed directly below



that in the Romans' Latin alphabet. Italic fighting spirit survives in a Corinthian-style bronze helmet (modeled at left) and in handles of an Etruscan serving vessel (below). Warrior performances at Etruscan funerals may have given rise to Rome's gladiators.

MUSEO CIVICO, GUBBIO (TABLET); MUSEO DELLA PREISTORIA DI GELANO (HELMET); MUSEO ARCHEOLOGICO NAZIONALE DELLE MARCHE



AGAINST ROME



the sheep are grazing right now is one of the major temples of the city. Where you see that slight depression was one of the porticoes of the forum." Below us, amid the leaves, I could hear the stream rushing, with a sound like the wind, and the bleating of the distant sheep. "No major Faliscan settlement has been excavated yet," Terrenato said. "This is an archaeological park waiting to happen."

The road southward is lined with deep, hollow chambers, family tombs carved into the tuff. Grave robbers long ago took whatever there was inside, selling much of the information we might have had about this elusive culture. One of the few bits that remain is a piece of pottery, possibly a drinking vessel, decorated with a phrase of Faliscan poetry: "Today I drink wine," it says, "for tomorrow I may go without."

"There's a traditional received wisdom," Terrenato said, "that says that the Romans basically have a leading edge and are able to conquer everybody. But what I and some other people are thinking now is that the Roman conquest wasn't about erasing regional differences, but building an overarching structure that allowed the communities to maintain their identity."

He was pulling at some bits of root embedded in the crumbling stone wall. "We haven't persuaded everybody yet," he went on. "What you see on TV is still pretty much the old way, the Romans marching along beating the crap out of everybody."

"But a lot of elites didn't disappear with the Roman conquest. In a lot of cases they seemed to prosper from it. The Roman Senate fills up with Faliscan, Etruscan families, people from all the

ITALIC PEOPLE AREN'T DEAD; ITALY



supposedly conquered lands. Economic power often stayed in the hands of those who had it before.”

He kept walking slowly down the road between the tombs. “We shouldn’t assume that the Roman conquest was such a traumatic event for a lot of people,” he said. “I’m not saying nothing happened, but it’s more a political reorganization to which everybody contributes. So your options, if you’re an Umbrian, say, are either starting your own conquest or joining with Rome. By 300 B.C. remaining a small-scale independent is no longer an option.”


Except for the Samnites. “The Samnites are the perfect example of what happens when things don’t go according to plan,” Terrenato agreed. “Apparently the Romans can’t offer the Samnites anything that will make them happy.

This is the bleeding wound of the empire. If the Romans had had to deal with six ethnic groups like the Samnites that wouldn’t go along, the empire wouldn’t have lasted a week.”

I’d seen much of the pre-Roman cultures, their possessions and dwellings and graves, but I hadn’t seen their faces till I found myself in front of a man of stone, a life-size statue called the “Warrior of Capestrano.”

He represents a king of the Vestini, an Adriatic coast people, and he was made sometime during the sixth century B.C. to stand foursquare atop a grave mound to alert travelers that they were approaching his territory. Impassive, armed, he stood ready to defend his land, the fields of wine and oil and bread, the emerald green of the wheat latticed with vines, and the shallow

PULSES WITH THEIR DREAMS



Now a portal for passing sheep, this gate marks the ruins of Falerii Novi, once the capital of the Faliscan people. When the Faliscans moved their capital here, 25 miles north of Rome, in 241 B.C., they gained access to a new Roman road, the Via Amerina. In turn the Romans gained a way station on the route north. Such cooperation, some scholars now believe, helped the Romans to thrive and the Italics to retain some of their cultural identity—much to Italy’s lasting glory.

DAVID ALAN HARVEY

stony rivers rushing toward the sea from the Apennine ramparts.

Today he is standing in the archaeological museum in Chieti, watching school groups stare at him. He clasps a sword and an ax, objects identical to those found in real tombs. He wears a fantastic broad-brimmed hat and a carved collar that would have been bronze, and carved droplets on his biceps represent pendants of amber that would have hung from a metal armband. A disk covers his heart, and a strap connects it to the protective disk on his back. The details are perfect.

Inscribed along one of the spears at his side, in the ancient language of the region, is the stout phrase, “Aninis made a fine portrait of me, the king Nevio Pumpuledio.”

Kings and artisans, merchants and priests, warriors and iron smelters and shepherds and traders, the earliest Italians were as intrepid and ingenious as the Romans who came to dominate their land. To discover their clever hands and resonant words is to find sources of inspiration even deeper than we once suspected. The Italic peoples aren’t dead. They’re everywhere, and Italy still pulses with their dreams. □

FOOTPRINTS IN TIME See the personal touch that two slave girls left on a Samnite temple roof tile, in the Zoom In photo gallery at nationalgeographic.com/magazine/0501.

among the



berbers

a journey
through morocco's
high atlas mountains



A Berber groom kisses his bride at a mass wedding in Taarart, in the eastern High Atlas. Though dominated by Arabs for centuries, Berbers make up a majority in Morocco. While those in cities lead a revival of Berber identity—pushing for recognition and rights—Berbers in the hills eke out a living as farmers, carrying on a culture that dates back at least 5,000 years.

Once a seat of Muslim mystics and still a lure for pilgrims, the town of Zaouia Sidi Hamza was built in the 1600s, when Islam in the High Atlas was already long established. As Muslims, rural Berbers often learn some Arabic, but their first language remains Tamazight, the traditional Berber tongue.





An annual festival near Imilchil draws Berbers from throughout the eastern highlands for a three-day frenzy of trade—in everything from mules to teapots to barley, the local crop. Though they take pride in being self-sufficient, mountain Berbers rely on markets for such hard-to-find staples as oranges, spices, sugar, and medicines.







They came up suddenly, the two teenage shepherds, like a pair of wraiths, and as they followed us out of the dry riverbed and up the scree-covered mountainside, their hair wild and unwashed, their wool capes streaked with mud and draped rakishly over their shoulders, they watched us with wary, close-set eyes. My companions, Driss and Khalid, called out in Tamazight, the Berber language used in the High Atlas mountains, their words echoing down the canyon. The shepherds didn't answer. But when they

heard Khalid speak to Driss in Arabic, they exchanged a worried look and scrambled back down the slope, shooting us fearful glances. With my sunburned skin and brightly colored pack, I must have looked like a Martian, and Driss and Khalid, though Berber, were dressed in Western clothes and were clearly outsiders—a fact that their Arabic, a language rarely heard at these altitudes, only drove home.

A storm was about to break over the treeless ridges above, and night was coming on. We set up our tents on a patch of level ground and climbed inside just as thunder sounded. I lay back and peered out through my tent's gauze window, grateful for the rest.

But not for long. On a nearby ridge, silhouetted against the thunderheads, appeared two middle-aged men armed with staffs. They began shouting at us in Tamazight, their voices hoarse with anger, their capes flailing in the wind as they approached the stony slope where we were. "Calm down, please, we're just passing through," Driss shouted to them from outside his tent.

"Who gave you the right to cross our valley?" the men yelled, brandishing their staffs.

"The chief of Bou Terfine!" Driss said, referring to a village authority we'd visited a few hours before. "Please, there's going to be a storm. We mean no harm. Let us camp here for the night."

Invoking the village chief only made them angrier. Calling us intruders, the fiercer of the

two slammed down his staff and issued an ultimatum: Storm or no storm, we had to get off their land, and fast—or else.

We still had some 400 miles of mountains left to cross, and this was an ominous beginning to the trip, though entirely in keeping with the spirited history of the people we call Berbers. (Most prefer the name Amazigh, or Free Person, but the term Berber still holds sway outside the region.) Numbering some 25 million in North Africa and concentrated today in Morocco and Algeria, they are an ethnically distinct tribal people who inhabited these mountains and deserts thousands of years before the Arab conquest brought Islam here in the seventh century A.D.

In the centuries after the conquest many Berbers were driven from the plains to the high country, where they sought arable land, grass for their livestock, and, above all, freedom. Berbers in the lowlands adopted the cultures, religions, and, to an extent, the languages of their conquerors, who have included, besides the Arabs, the Romans and the French. But those isolated in the highlands managed to preserve their identity, their language, and, as was becoming clear, their independence.

My trek had begun near Midelt in central Morocco and was scheduled to end two months later at one of the country's most scenic spots, the waterfalls of Imouzzer des Ida Ou Tanane, by the Atlantic. This route would take me through the heart of the Berbers' domain, where I would encounter traditional Berber culture. I'd hired two Berber men to travel with me: Driss Hemmi, an affable 30-year-old mountain guide from Midelt, who earned his living taking the region's few tourists through accessible canyons of the eastern High Atlas, and Khalid Ouamer,

Bold strokes of saffron mark a woman in Zaouia Ahansal as the mother of a boy being circumcised and also as a Berber, or Amazigh (Free Person). Most Moroccans, even in cities, descend from Berbers yet identify themselves as Arab and speak only Arabic. Until recently, the teaching of Berber was suppressed.



a mild-mannered farmer, 23 years old, from a village near Midelt.

To carry our gear and supplies, I'd bought a docile brown mule whose sad eyes and strong legs told me he was born to suffer the trials ahead of us. Right now, of course, we faced an immediate test: thunder rumbling through the canyon, darkness setting in, shepherds threatening violence. I suggested to Driss that we offer them money—the usual means of settling such disputes in Morocco. He frowned. "I've tried, but they won't listen." But then, on impulse, he pulled out his guide license, showed it to the shepherds, and explained that our mission was to traverse the High Atlas. The license appeared to grant Driss legitimacy in their eyes, and his explanation calmed them down.

One of the shepherds, squatting in front of my tent, regarded me with hard eyes. He spoke to me through Driss. In 1992, he said, a group of Arabic-speaking foreigners turned up here with plans to overthrow Morocco's King Hassan II. The intruders were captured after the shepherd and his family alerted the authorities. No wonder some Berbers are suspicious of outsiders speaking Arabic, whose ranks may also include government officials from the lowlands with their hands out for a bribe.

I apologized for disturbing him and promised we'd leave in the morning. Without cracking a smile, he agreed to let us stay, and left. Within minutes the clouds lowered, lightning lit the ridges above us, and a pounding rain replaced drizzle. I tried to sleep but started awake frequently at the stomping of our mule tethered nearby.

Soon after the season's first rain, a farmer plows a wheat field in the Imechimene valley. The mountains allowed Berbers to escape conquest and assimilation by Arabs and earlier invaders, but life is hard: Families often rely on money sent from urban relatives.

Berbers live throughout North Africa, but nowhere has denial of their identity been more systematic than in Morocco, ethnically the most Berber of the region's countries. Although 60 percent of its population claim Berber descent and nearly 40 percent speak one of three Berber languages, Morocco's constitution declares the country part of Arab North Africa, proclaims Arabic as its official language, and makes no mention of the Berbers. This is a legacy of the Arab nationalism that sparked colonial-era independence movements in the region and, in the name of unity, ignored or even suppressed the cultures and languages of non-Arab peoples.

For many of the past 13 centuries, the High Atlas mountains—some of northern Africa's most remote and forbidding territory—have been controlled by armed Berber warlords who refused to submit to the Arab sultans ruling Morocco's plains. From 1912 to 1956, when most of Morocco was a protectorate of France, the French designated the mountains a tribal area and left them under the de facto control of collaborating local warlords.

The most famous of these was Thami el Glaoui, a tyrant who subjugated first Berbers of the High Atlas and later, when appointed to rule as France's viceroy in Morocco's south,

BERBER HEARTLAND

For two months by mule and on foot, author Jeffrey Tayler trekked the High Atlas's 400-mile spine. Berbers, the indigenous people of North Africa, live mainly in Morocco and Algeria.

Scale varies in this perspective.
NATIONAL GEOGRAPHIC MAPS



MOROCCO

Marrakech
Jebel Toubkal
13,665 ft 4,165 m

Plateau Kousser
13,356 ft
4,071 m



Arabs of the nearby plains. Berber resistance never abated, however, and the mountaineers, along with Arab rebels in cities, drove out the French in 1956.

After independence, Morocco's Arab-controlled government adopted a hands-off policy in the mountains. In the cities, protests, underground newspapers, teaching of the old Berber alphabet, called Tifinagh, in classrooms, and talk of revolution have all been aspects of a nascent Berber struggle for cultural recognition that has grown stronger over time.

The urban Berbers leading this revival movement are intellectuals who use French, a language they associate with culture and human rights, rather than Arabic, which they despise as the language of their oppressors. But the language they're really pushing is Tamazight, or Berber. During the last decade of Hassan II's rule (which ended with the monarch's death in 1999), they founded Berber language and cultural associations, set up websites and newspapers, and, in 1994, won the right to broadcast news in Berber on national television.

In March 2000 several hundred Berber intellectuals signed the Berber Manifesto, which describes the humiliation and alienation many Berbers feel as members of an oppressed minority. The manifesto demands, among many other things, the development of the long-neglected

Berber rural areas, state financial support for Berber cultural institutions, and the rewriting of school textbooks to accurately reflect the role Berbers have played in Moroccan history.

The movement won a victory in September 2003 when, for the first time, the Moroccan government permitted the teaching of the Berber language in nearly 15 percent of the country's primary schools and announced plans to extend instruction in Berber throughout all levels of education. Not enough, say the activists, who are pressing for full recognition of Berber people and language in the constitution. "We will struggle peacefully for recognition," Mohammed Chafik, the spiritual father of the Moroccan Berber movement, told me, "but if none of our demands are met, the movement may radicalize. Young people may revolt."

In the cities, perhaps. But many of Morocco's Berbers live far from any urban center, high up in the mountains, where drought, poverty, and hunger often prevail, and on my journey I meant to discover if the smoldering radical spirit of urban Berbers had spread to the mountains. If so, the High Atlas could again become what it has been in the past: guerrilla terrain par excellence, beyond the control of the government.

Storm clouds had given way to a scorching noontime sun as we descended a hairpin trail into a ravine of striated pink-and-yellow rock, heading toward a distant promontory atop which clustered the stone and adobe houses of the village of Tamalout, where Driss had a friend, Hossein Ounaminou.

We came upon Hossein riding a bony mule





The women of Anefgou mourn the death of one of their own, from old age. Tied to the countryside by tradition and lack of education, women "do the heavy lifting," says GEOGRAPHIC researcher Marisa Larson, who served this region as a Peace Corps volunteer. Women plow the fields and raise the children while their men increasingly toil in the cities.

down the trail outside the village. He was a gaunt, bearded man in his mid-50s. From under a threadbare black turban, his warm eyes and snaggletoothed smile conveyed pleasure at seeing Driss again, and he welcomed us to Tamalout. Hossein leaned down and shook our hands, after each shake kissing the tips of his fingers in accordance with local custom. Driss asked if we could stay at his house. Dismounting to walk with us, Hossein said he would have it no other way. In Berber culture, hospitality graces even the simplest of homes.

On the outskirts of the village we had passed a circular lot some 50 feet wide with a stout pole poking through a foot of cut barley. Three young men in turbans and sweaty white smocks were threshing the grain, using whips to drive a half dozen donkeys tethered in a line to the pole. As the animals plodded through the grain, the dust flew up and caught the sun like powdered gold. In the surrounding fields of wheat and alfalfa, men plowed by mule, reaped by hand.

As we entered the village, children saw me and cried, "*Arrumi!*" ("Roman!"), an offhand tribute to rulers 16 centuries gone and the name by which Berbers still refer to Westerners. Little appeared to have changed since the days of the Latins: Barefoot boys used sticks to prod sluggish cattle toward their pens; turbaned men sharpened scythes on whetstones; women trudged by, amphorae of sloshing water on their backs.

Hossein lived in a dwelling typical of Berbers in the High Atlas—a squat house with stone walls and a wood-raftered roof. The ground floor was a stable in which he quartered his mule, a cow, and a few scrawny chickens. In a room on the second floor, a tarnished bronze dagger dangled from a hook; from another hung a long-dormant clock. Carpets of faded orange, red, and green wool overlapped on the floor. To freshen the air, Hossein opened the windows, and in rushed flies from the stable. Shooing them away, we stretched out on the carpets as Hossein ordered unseen women in another room to prepare lunch.

Soon we were joined on the carpets by Bassou, a visiting teenage neighbor dressed in jeans and a jaunty black fedora, and by Hossein's young daughters, Itto and Hadda, who wore floral blouses and skirts, with wool leggings underneath. ("Itto" is a Berber name one rarely hears in urban Morocco, or even outside the eastern High Atlas. For decades the Moroccan authorities prohibited registering children with

Berber names but in recent years have grown slightly more tolerant.) I asked the girls their ages. Both shrugged. Keeping track of birthdays isn't considered important in rural Morocco. Itto, scarved and peering bashfully at us from between her fingers, appeared to be about ten; her sterner sister, Hadda, looked older.

Bassou pointed to Hossein. "Even Hossein doesn't know his age," he said lightheartedly in Arabic. "He's just old and senile!" Hossein smiled at me, apparently uncomprehending. To get by in the cities, where men often go in search of work, Berbers must learn Arabic. But here in the High Atlas, where most inhabitants speak Berber, Bassou's fluency in Arabic distinguished him. He attends secondary school near Midelt—Tamalout has only a newly built elementary school—on a scholarship and was proud of it. "I'm good in math and science," he said. "I read a lot of books in French and have French friends. I want to go to university." He hoped to use his education to escape the poverty of his village for a more promising future in the city, but getting a job in Morocco, for Berbers and Arabs alike, frequently depends not on talent but on connections.

Hossein brought us the first course of lunch, a bowl of clarified butter and shards of home-baked bread. He told us that he owned one cow, but to earn money, he rented it to a well-off neighbor, who took most of its milk; he had a small field on which he grew barley and wheat; he collected firewood in the surrounding cedar forest. Though ever thanking God for his lot, Hossein was as poor and thin as most Berbers we were to meet on our trip, and he would be lucky to grow enough food to feed his family.

During the second course—a watery stew of onions and goat meat served in a clay terrine—Hossein showed he knew at least some rudimentary Arabic. He asked me, in Arabic, "Shall I pass you the meat?" I looked puzzled, and Bassou laughed: Hossein had meant salt.

"By God, my tongue will lead me to jail!" declared Hossein. He told how he had recently been summoned to testify in court against a fellow villager charged with logging illegally in the forest. Through a Berber-Arabic interpreter, Hossein testified in favor of the accused, but he understood enough Arabic to suspect that the interpreter, who'd probably been bribed, was distorting his words to convict the man. "I told my story to the judge in my own words,"



Hossein exclaimed. “I had sworn to tell the truth and only the truth, and that’s what I did.” The accused was acquitted.

Hossein was lucky to find an in-court interpreter, which the Berber Manifesto demands. With its emphasis on protecting Berbers from discrimination because of their language, the manifesto ignores another critical issue: Arabic-speaking Moroccans also face difficulties, especially when dealing with the government, where French is widely spoken.

When we reached Imilchil, I decided we needed a second mule, to lessen the burden on our first one and to carry us when we were tired. Driss and Khalid visited the Sunday market and bought a fine ebony male. Like our other mule, he neither kicked nor bit and looked hardy enough for the trails ahead. We set out, climbing higher and higher into the pink moonscape mountains beyond Imilchil toward Plateau Kousser, the land of Berber nomads.

Four days later we reached the plateau: a sea of cratered stony swells and spatulated lava valleys that taxed us as much as any mountain would have. As the sun dropped, we neared the sole permanent dwelling we were to see on the plateau—a house of rock and cement built into the mountainside just above a gorge. The matron

Following Muslim custom, villagers circumcise a two-year-old in a Taarart courtyard. In a few years he will begin learning the Koran at a local mosque, and round out his education at the village’s government school.

of the house, whose name was Fatima, emerged dressed in the mishmash of colorful wraps worn by nomadic Berber women. We asked to spend the night; warily, she invited us in.

We sat down for tea in the cool of her stone sitting room, beside the loom on which she wove carpets from her sheep’s wool. While her husband works as a laborer in nearby Zaouia Ahan-sal during the summer, she and her teenage son, Ali, stay up here to care for their small flocks of goats and sheep, as well as a few chickens—a common situation that leaves Berber women in charge of households for months at a time.

Fatima had seen me arrive on muleback. Now she told us that a girl here had recently fallen from a mule and died, as there was no doctor nearby to help her, and no way to call one. There are few doctors in the High Atlas, and practically no pharmacies or phones or post offices—no surprise, considering the rugged terrain. But Berbers cite these deficiencies as evidence that the government has avoided developing the region to keep all power in its hands.

“No king has ever come up here to see how we



Absorbed in the music, a woman dances at a Taarart wedding, where men and women meet face to unveiled face. Compared with their counterparts in other parts of Morocco, Berber women in this region enjoy relative freedom—in their relations with men, in their dress, and in making household decisions.





In rural villages (where homes are typically decorated with white paint), most Berbers remain illiterate. But Mustapha Ali Drehmi (opposite) reads Arabic, and soon he'll be able to read his native tongue: In 2007 Mustapha's school in Taarart will start offering lessons in Tamazight. "I can't wait," he says.

live," Fatima announced in a commanding voice, holding her green scarf to her tattooed chin. "Our representatives in parliament only come around at election time to promise things they never do." She began a litany of complaints: Officials in the local government steal the funds sent from Rabat for the building of roads (leaving her with a five-hour hike to the nearest dirt track), the provision of water (the closest well is an hour's walk away), and for the construction of clinics (the nearest hospital is in Azilal, ten hours away). And then there was drought, she said.

"There's no way to make things better," her son, Ali, said. "Everything here is done by bribes."

Fatima told us that once during Hassan II's reign—she couldn't recall the exact year—300 irate Berbers gathered in Ouaouizarht (pronounced wa-wi-zart), the regional center, from which they planned to go to Rabat and protest against their government's neglect. The provincial governor learned of their plans and sent

truckloads of soldiers to stop them. The soldiers' appearance scared the crowd into dispersal. Since then no one has dared suggest further protest.

Night fell. Fatima lit a lantern, and, as a stew of chicken and potatoes bubbled in the pot, she began working on her loom, weaving a carpet from scraps of wool. She had spoken her mind in a way Berber women in the mountains often do. But even Berbers who are forthright on other matters rarely offer direct criticism of the king and parliament, as Fatima did. They expect little from their government and voice no interest in the movement purporting to act in their name in the cities.

"The Amazigh [Berber] movement is just talk," Khalid said. "No one cares up here." Was he for having Berber taught in schools? No. "We Berbers want to keep our language secret, but city people want to learn it so they can do business in the countryside." Driss disagreed, and said he looked forward to the day when all Moroccans would learn Berber. The two of them argued frequently during our trip, which I took as an indication of how hard it was for rural and urban Berbers to agree on anything, from the Berber Manifesto to whose turn it was to do the dishes.

"Go tell the world about the fate of the nomads!" Fatima enjoined me at seven the next morning, as she accepted the money we handed her for her hospitality. "We have no roads, no

hospital, no nothing up here!” Her complaints followed us out the door and down the wooded path, as we began the last leg of our journey.

Grand vertical sheets of limestone announced the waterfalls of Imouzzer des Ida Ou Tanane, above the village of that name. We were 51 days out of Midelt. A trail led past souvenir stands to the falls, and Driss and I followed it, leaving Khalid with the mules. On arrival we found not the splendid crashing torrents I’d seen in photos but only one narrow stream dropping from rock ledges into a mossy pool. The drought affecting the High Atlas had forced the government to divert the river for irrigation, all but drying up the falls.

There was something symbolic about this. We had traveled across steep terrain as parched and depleted as it was remote. Drought and poverty force Berbers to quit the mountains for the cities, where they need Arabic to get by and French to prosper and where they adopt urban culture to fit in. Hunger, I saw on my trek, threatens the culture of the High Atlas more than anything.

I looked at Driss, who had talked so much

about his desire to help his people. If illiterate mountain folk show little interest in the Berber movement, with its secular and Francophile tendencies, educated urbanites like Driss suit it well. But in our last weeks together he revealed his most practical hope for the future: immigration to Canada. “There’s no future for me in Morocco,” he said, referring to the sad state of tourism due to fear of international terrorism. “I’m at the age when I want to have a family, so I want to join my sister in Montreal.”

Berbers living in the High Atlas, of course, have no such option. For the thousands who move to the cities, Morocco offers a harsh existence—life in ■ shantytown on the outskirts of Casablanca or Rabat and a scramble for cash to survive. For those Berbers who remain behind, there is hardship, too, and hunger. But there is also the solid rock of home underfoot, and the perfect stillness, and the undiluted pride of the Free Person.

YOU’RE INVITED to ■ mass wedding, Berber-style, through the words and pictures of photographer Alexandra Boulat. Also, author Jeffrey Tayler describes his two months on ■ mule in Berber country ■ nationalgeographic.com/magazine/0501.





Reunited with his grandmother in Taarart, a young man will soon return to Rabat, Morocco's capital, where he'll earn money to support his family in the High Atlas. Increasingly, the Berber future rests with such emigrants: Can they help their villages survive? And as they adapt to city life, will they abandon Berber culture—or fuel the Berber revival? □



AMERICAN LANDSCAPES

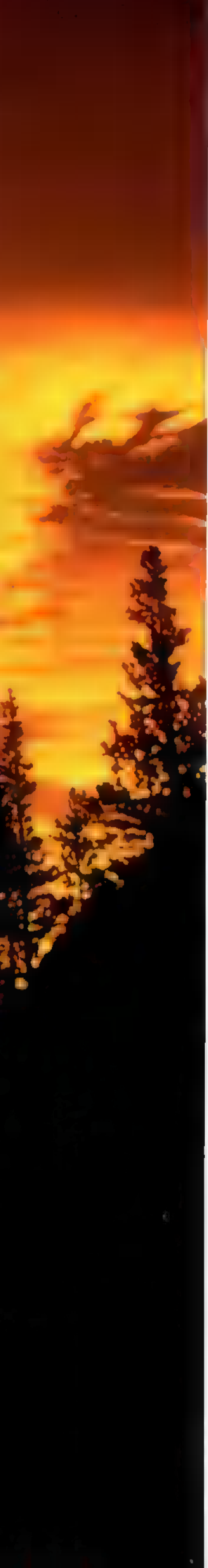
beyond the valley of wonders

YOSEMITE NATIONAL PARK

Its pulse-quickenning range of natural highs attracts more than three million visitors each year, most converging on the park's main valley to gaze at icons like El Capitan, above, and Bridalveil Fall, right. But beyond the herds of tourists there is another Yosemite—less familiar, perhaps, but charged with power of its own.







BY WILLIAM LEAST HEAT-MOON
PHOTOGRAPHS BY PHIL SCHERMEISTER


[the drink box]

In the middle of Yosemite Village in the deep valley of California's upper Merced River is a soft-drink machine, and on its front is a large posterized photo of a golfer about to tee up, golf cart at the ready. Large words proclaim: DISCOVER YOUR YOSEMITE. I had just come from talking with Ranger Scott Gediman, who told me, "National Parks aren't for entertainment." Yet within the Yosemite boundaries are the golf course, a refrigerated ice-skating rink, five ski lifts, snowboard runs, a kennel, a sports bar with a big-screen TV, and an annual costumed pageant reenacting an English Christmas dinner. As I tried to make note of the pop machine, I was jostled by a passing multitude bestrung with gear: cell phones, MP3 players, and pagers. I dodged baby strollers hung with diaper bags, cars with video cameras poked out the windows, and a tandem bicycle pulling a trailer hauling two barking dogs the size of large rodents. The crowd was shod more in flip-flops than hiking shoes, halter tops outnumbered field shirts, and the people licked ice-cream cones and munched tacos. Was I at a mall or in a valley world renowned for its natural wonders and its 800 miles of trails? Within an ace of the drink box were two hotels, a large store, a jail, a post office, an ATM, parking spaces for 2,000 cars, and more than 200 miles of asphalt pavement. The Yosemite I wanted to discover had to be somewhere else, both in time and place.

[butterflies]

So well hidden in the Sierra Nevada is this valley that Euro-Americans did not enter it until 1851, when James Savage, operator of three trading posts in the area, led in a militia band called the Mariposa Battalion to threaten or brutalize the native residents of the valley into submitting to the increasing incursions of gold miners and settlers. On their first night, Savage's men camped near the Bridalveil Meadow. The next morning the Indians, the Ahwahneechee, seemed to have disappeared but for an elderly woman, who said, "I am too old to climb the rocks." When she refused to reveal where her people had gone, Savage (as if to fulfill his name) torched the bark homes and the food caches of the

A swirling, ethereal dawn over Tioga Pass illuminates a land that has inspired almost religious devotion from those who have drawn near. These prophets—such as writer John Muir and photographer Ansel Adams—saw Yosemite's light and spread the word.



Even the rocks seem to need a toehold at Chilmualna Fall, a slippery pitch in a park that rises more than 13,000 feet above sea level. Yosemite's varied elevations create a climatic mosaic that nurtures a wide variety of plants, including lichen-dappled firs in Tuolumne Grove (right).





In Cook's Meadow a mule deer nibbling milkweed plants may raise visitors' expectations of a Yosemite as gentle and benign as Bambi. Yet each year in the park people probably have as many problems with deer as they do with bears. Why? Because tourists creep too close for the animals' comfort.

Indians and thereby began a forced and merciless dispersal that was complete in less than two years. Mariposa means "butterfly" in Spanish and Merced is "mercy," but a local Indian name is closer to the history: Yosemite is probably a corruption of *yo'hem-iteh*, or "they are killers."

[the lost report]

In another Yosemite Valley meadow—meadows were once more extensive here—Frederick Law Olmsted camped in 1864 while employed by a New York mining company after being hired away from his job designing Central Park. He was managing a large holding near present-day Mariposa, where the California gold-rush bonanza was giving out. The father of American landscape architecture saw wealth of another sort, a stunning cornucopia to enrich the work of artists and natural scientists and, as significantly, the spirits of common citizens. A month before Olmsted's stay in the meadow, President Lincoln signed a congressional act establishing a grant to reserve two areas of what today is Yosemite, the valley and a southerly grove of sequoias. After his expedition Olmsted wrote a report for the California legislature then governing the grant. The document is a landmark expression of the principle that a government should set aside places of signal scenic value for its citizens. Central to his reasoning is the belief that scenic beauty both calms and invigorates a human nervous system.

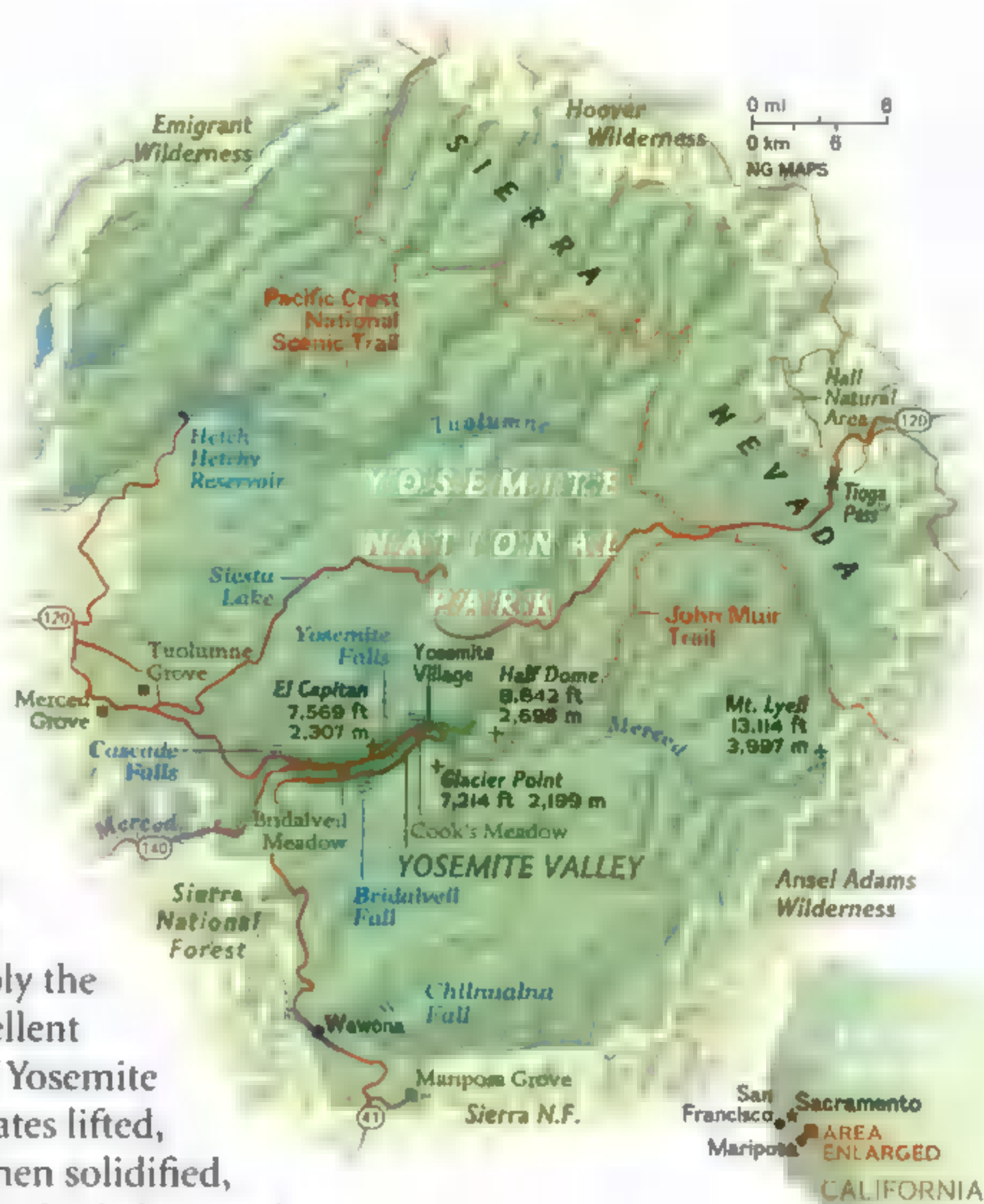
His report, with its timeless guidelines, never reached the legislature and remained unpublished until 1952. In the meantime, certain commercial endeavors got established in the valley and metastasized.

[three thousand feet of air]

For its size it's possibly the most famously photographed small rock in the West. About the size of a large picnic table—for which it's been used—Overhanging Rock at Glacier Point has also served as a parking space for horseless carriages and, later, Pierce-Arrows and Studebakers. It's been a stage for a pair of dancing ladies in hoop skirts, a veritable magnet to back-flipping daredevils and the simply foolhardy. The pointy rock is famous for what is under it: some 3,000 feet of air, and only air, unless you count at certain moments raindrops or snowflakes. The view from behind the railing looks into Yosemite Valley and on toward the mountainous miles beyond and offers arguably the most spectacular vista in America. It's an excellent place to try to comprehend the fabrication of Yosemite from deep oceanic sediments into tectonic plates lifted, shifted, subducted, and melted into granite, then solidified, only to be lifted once more and deformed, dissolved, deepened, and dislocated by water and ice. From Glacier Point one sees a grand contorted display of the power of water and gravity—water the chisel, gravity the hammer, and the sculptor your notion of the originator of all things.

[one whopper of a two-by-four]

Far from the crowded valley, I stood before a stump that matched the photographic fame of Overhanging Rock. To attract tourists—and perhaps help them comprehend the immensity of a sequoia—a couple of sawyers in 1881 cut a huge notch through the base of a tree, a hole large enough to allow a triple-team stagecoach to pass. The gimmicked tree, the Wawona Tunnel Tree, more than 2,000 years old, indeed drew tourists with cameras—and pocketknives—and began a fad in California of tunneling through large trees. The size of an upright sequoia, by volume the largest living organism on Earth, is difficult to conceive, and one can argue that for the most mobile nation in history, passing a wheeled vehicle through is an effective demonstration of size—and age—and is surely better than downing, say, the largest sequoia of all and turning it into a two-by-four 175 miles long. When I looked inside the now fallen Wawona stump, I found it like an old outhouse wall, carved with thousands of Kilroy Was Here's. In Yosemite it's almost axiomatic that an increase in elevation equates to a decrease in the throng, but this legendary giant couldn't go high enough to escape the tourists. Wawona, a Yosemite Indian name for a sequoia, is a word imitating the hoot of an owl, the guardian spirit of the big trees.



In the mid-19th century loggers, tourists, and livestock were eating away at Yosemite's wilderness, prompting some folks to bite back. President Abraham Lincoln granted California 60 square miles of federal land for a state park in 1864. John Muir, dismayed by the state's lax stewardship, urged Congress to establish Yosemite National Park in 1890. But the valley remained under state control. Sixteen years later President Theodore Roosevelt helped graft the valley onto the park, which now covers 1,200 square miles.





Without any chlorophyll to make them green, snow plants grow in a riot of red, feeding on humus that carpets the forest floor. Clenched like a fist as winter beats its annual retreat, the bud of a yellow pond-lily hovers just above the stillness of Siesta Lake.

Wawona,
a Yosemite
Indian name
for sequoia,
is a word
imitating
the hoot
of an owl,
guardian
of the big
trees.

[saving the park]

Euro-Americans may have been slow to find Yosemite Valley, but it took tourists only four years to arrive following Savage's expulsion of the native residents. A mere year after the initial visitor, the first hotel, a ramshackle thing, went up south of the Merced River, and soon rocks were getting painted into billboards advertising patent medicines. Despite the area being in the hands of the national government, squatters—many of them failed gold prospectors—moved in to put up more facilities and begin farming the incomparable valley. Yosemite was on its way to the disfiguring commercialism so evident, then and now, around Niagara Falls. Valley businesses descending from the squatters are still in the park in various permutations, even though some of their enterprises have been slowly curtailed: The Cadillac dealership is gone, as is one of two golf courses and the once famous "fire-fall," wherein burning embers were shoveled off Glacier Point to create a 3,000-foot shower of orange coals.

In the parking lot of the luxury hotel, the Ahwahnee, I saw a bumper sticker: SAVE YOSEMITE FROM THE PARK SERVICE. For the past two decades the National Park Service has laboriously created a plan laying out a future for Yosemite, particularly for the overrun valley, that seeks to balance tourism with sound conservation. The plan is thorough—2,300 pages and 27 pounds—and sensible. At its core are two changes: The first is moving facilities that do not need to be in the valley to other areas of the park, thereby returning the deep heart of Yosemite to something closer to its native appearance before the arrival of Savage's militia. The second: persuading tourists to use public transport instead of private autos to get around the narrow valley. Shuttles have already reduced traffic in the valley, although they have not eliminated two-mile-long lines of cars at peak hours. Superintendent Michael Tollefson said, "Our goal is to have a smaller human footprint."

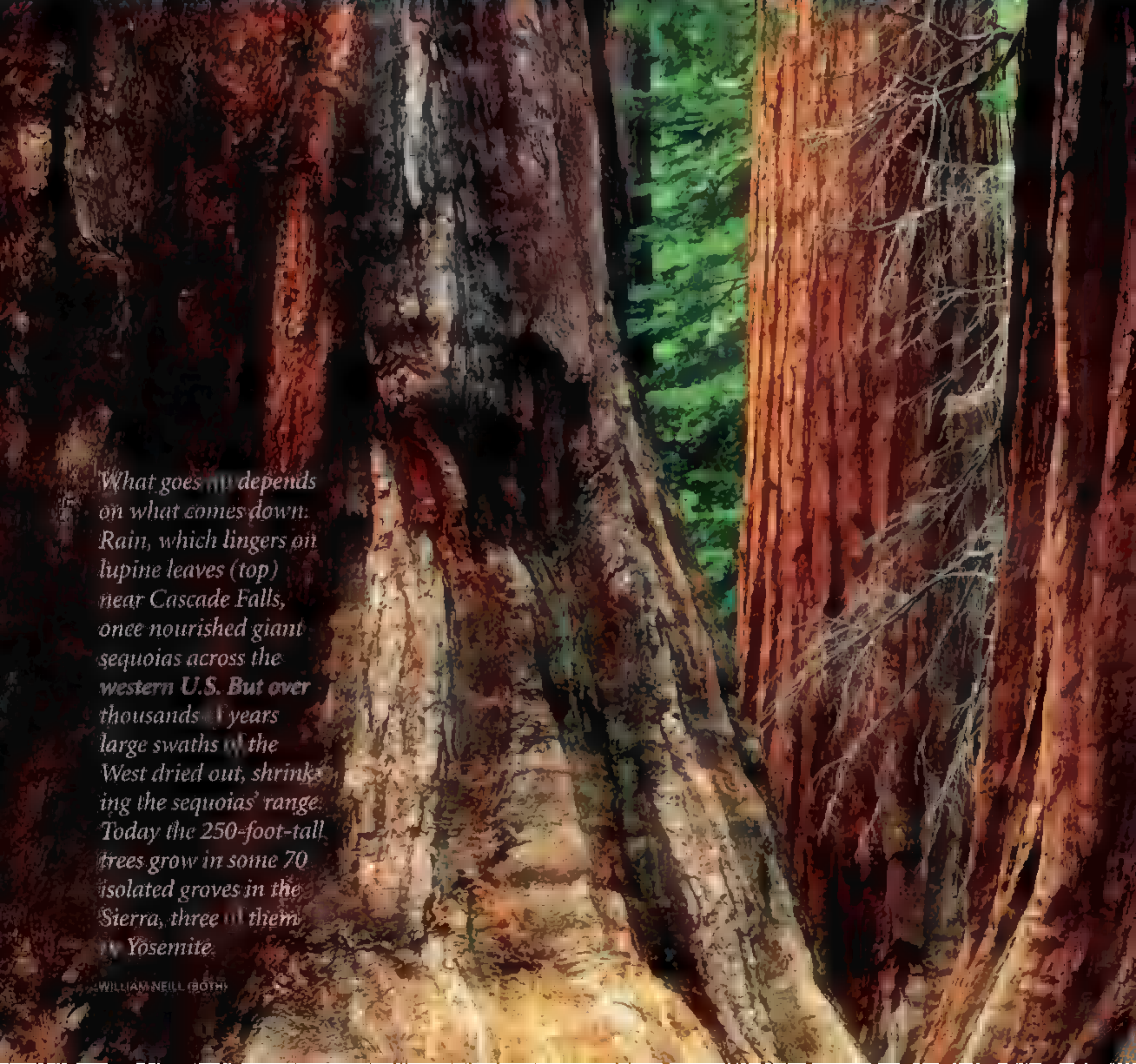
The National Park Service has gone to such length in listening widely to various and often conflicting positions that it has become hamstrung by minor voices often arguing for historical precedent. In Yosemite that has resulted in preserving a status quo that serves not the common citizen but almost certainly some enterprise with a direct pecuniary advantage. (A few environmental groups have also questioned some of the changes, especially those that affect the Merced River.) Olmsted, in his precocious 1865 report, put his finger on it, warning against sacrificing the future of the valley to the "convenience, bad taste, playfulness, carelessness, or wanton destructiveness of present visitors." We must not yield, he said, the "interest of uncounted millions to the selfishness of a few individuals."

[the view from the dome]

In my quest to experience a Yosemite matching my expectation, I headed toward the heart of the almost 1,200-square-mile park to a granite dome, this one comparatively small and (Continued on page 116)

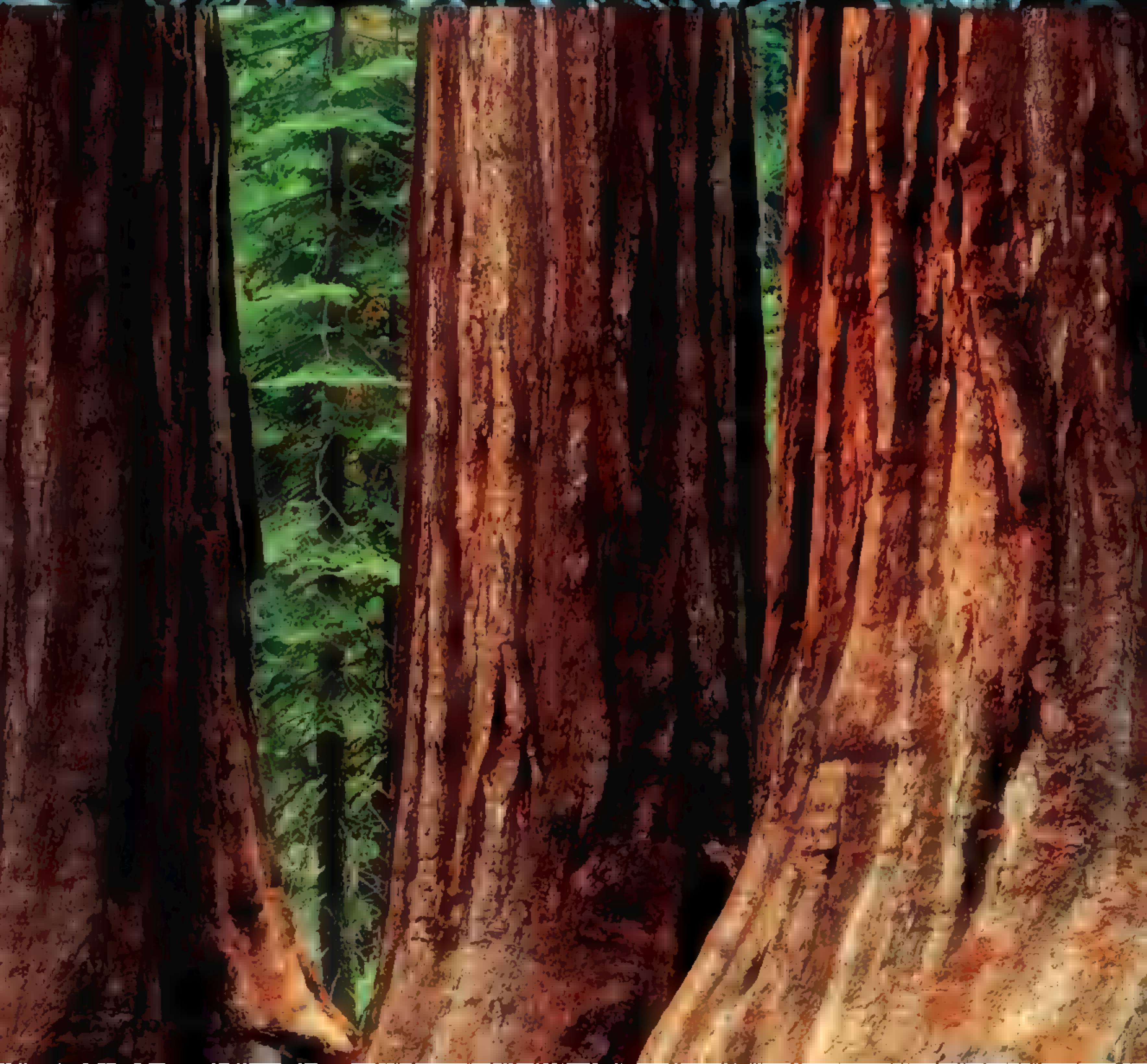
Spotted owls are usually nocturnal, but if hunger strikes when the sun still shines, the birds will too, swooping down and devouring squirrels and wood rats. While northern spotted owls are still threatened by logging in the Pacific Northwest, their California cousins have fared better in the shelter of Yosemite's protected forests.





What goes up depends on what comes down. Rain, which lingers on lupine leaves (top) near Cascade Falls, once nourished giant sequoias across the western U.S. But over thousands of years large swaths of the West dried out, shrinking the sequoias' range. Today the 250-foot-tall trees grow in some 70 isolated groves in the Sierra, three of them in Yosemite.

WILLIAM NEILL (BOTH)







Sprinkled by a shower of snow, a mule deer browses beside the Merced River, which burbles through Yosemite Valley before taking a noisy plunge—2,000 feet down six miles of rocky gorges. “Many a joyful stream is born in the Sierras,” wrote John Muir, “but not one can sing like the Merced.”

I could feel
this grand
beyondness
etching
itself into
my memory
as if each
crag, every
broken
boulder,
every spined
pinecone
were
inscribing
images.

Half Dome's peak is "perfectly inaccessible," wrote a geologist in 1869. Now visitors can climb to the summit on a cable-lined trail. For the Park Service, though, an old, familiar hurdle remains: how to keep the park pristine while giving people a taste of the high life.

undistinguished, bearing no name on my maps. Going up was like climbing the back of a mythically enormous turtle whose carapace was glaciated white granite flecked with black biotite. I was walking on what was once the floor of the Pacific Ocean, once rising magma, once the basement of numerous glaciers. Now the wide expanses of the slope were polished by ancient glacial ice. I was on a hike up through time, a geologic hike into sky.

I weaved upward among glacial erratics as big as bison, all of them waiting for that last grand slide down the dome. Among them were stones the size of quail eggs, unlike the bedrock in color, texture, and shape. These rounded and smoothed gravels had been carried to the top from some distant outwash 10,000 years ago. This place, so apparently solid and immobile, was moving: Pebbles carried up, boulders waiting to roll down, and the whole dome still rising a foot a millennium with the rest of the Sierra. I reached for a peculiar pebble that got up and hopped away before my eyes. Camouflaged to match the mountain, it was a frog—a thousand feet above the nearest standing water. Conifers, mostly Jeffrey pine, had found crevices the width of a broomstick and were drawing out a weather-tortured existence, twisting themselves into lovely grotesqueries. Clustered in the few places of scarce soil and shelter grew penstemon, Indian paintbrush, stonecrop, Sierra wallflower. Life, both rooted and legged, was extracting itself from a rock more barren than not, more hostile to organisms than otherwise.

Then I arrived on top, prepared for a jolt of some contemporary intrusiveness to open before me. But the view was quite different: to the east the magnificently jagged tops of the snowy Sierra and to the southwest the totem of Yosemite, Half Dome—but not its oft-pictured side. Rather, it showed me its humpy hind end. Looking at it was like watching a Shakespearean play from backstage, where old and familiar lines seem different, strange, new. I realized then I'd discovered my Yosemite. I could feel this grand beyondness etching itself into my memory as if each crag, every broken boulder, every spined pinecone were inscribing images. The ascent was like a journey back in time, but now I wondered what the view from the dome would be in a century, in an eon.

[reading Muir]

That night I could still feel the ascent not just in my legs but in my mind too, a sense of hope heightened by this passage John Muir wrote more than a century ago: "The regular tourist, ever in motion, is one of the most characteristic productions of the present century; and however frivolous and inappreciative the poorer specimens may appear, viewed comprehensively they are a hopeful and significant sign of the times, indicating at least a beginning of our return to nature; for going to the mountains is going home." □

GET LOST IN YOSEMITE Browse a gallery of Yosemite images, with tips from the photographer, then plan a trip to the park using our Online Extra at nationalgeographic.com/magazine/0501.



HOT COFFEE ROAD, MISSISSIPPI

Harper
Grocery

Robinette's
Kennel

Hot Coffee

39428

A java junkie's quest for true brew

BY PETER GWIN PHOTOGRAPHS BY BOB SACHA
NATIONAL GEOGRAPHIC WRITER



At Harper Grocery (right) the coffee's free after 2 p.m. "If someone's man enough to drink it, they can have it," says owner Herbert Harper. Nearby, writer Peter Gwin tests his manhood with Rlo, a drug-sniffing police dog.



Rio, a hundred-pound Czech shepherd, has locked his gaze on me as if I were a giant rabbit. He can barely contain himself. Quivering with anticipation, he emits high-pitched yelps, begging his master to utter the command that will launch him at me like a canine missile. Plainly put, he looks like a dog that's had one too many cups of coffee.

A police dog is not what I expected to find in Hot Coffee, Mississippi. As an avowed coffee junkie, I envisioned a quaint hamlet lined with tidy cafés serving all manner of frothy, caffeinated libations. The citizens of Hot Coffee would know their arabica beans from their robusta, grocery store off-brands would be outlawed, and the mayor might even be part Colombian. Perhaps there would be a coffee fountain in the town square. Forget Seattle, Vienna, and other self-proclaimed coffee capitals, I told myself. Hot Coffee, if only by the perfect simplicity of its name, must surely hold the key to true brew nirvana.

But when I got to Hot Coffee, about halfway between Jackson and Hattiesburg, reality was a cold shower. Hot Coffee isn't a quaint little town; it's not even a town. Instead it's a tiny community of farms, homes, and businesses scattered along two-lane Highway 532. The 12-mile stretch known locally as Hot Coffee Road runs from the town of Mount Olive to a crossroads that dates back to pioneer days. There, according to local lore, a resident opened an inn in 1870 and sold coffee to passersby. Apparently the drink was the only memorable thing about the place.

0 mi 1/4
0 km 1/4
NG MAPS

39428 & 39119

POPULATION:

15,220

NEAREST STARBUCKS:

Ridgeland, Miss., 70 miles

MOST POPULAR LUNCH

FOOD AT HARPER'S:

"Souise," or headcheese

FAMOUS SON: NFL quarter-back Steve McNair



Which brings me back to Rio, whose owner lives in a house built on the site of the old inn. I'd knocked on the door, hoping to find coffee but found instead Pete Robinette. He and his wife moved from Hattiesburg to expand the kennel where Pete trains law enforcement dogs to sniff out drugs and apprehend suspects. It's this latter skill Pete offered to let Rio demonstrate—on me.

"You ready?" Pete calls. Rio leans forward. Although I'm wearing a heavily padded sleeve over my right arm—which Pete assures me is the only thing the dog will bite—my mind races. How in the name of Juan Valdez did a story about coffee become an episode of *Fear Factor*?

It's over before I know it. I vaguely recall offering the sleeve like a giant bone and Rio chomping it with the force of an alligator. I remove the sleeve and pet the panting dog, my arm throbbing. Pete is grinning. "You want to do it again?"

I politely decline and take my leave, hoping to find a coffee shop farther down the road. Instead I find a blueberry farm. I pull over, reasoning that where there are blueberries, there is pie, and where there is pie, there must be coffee.



532

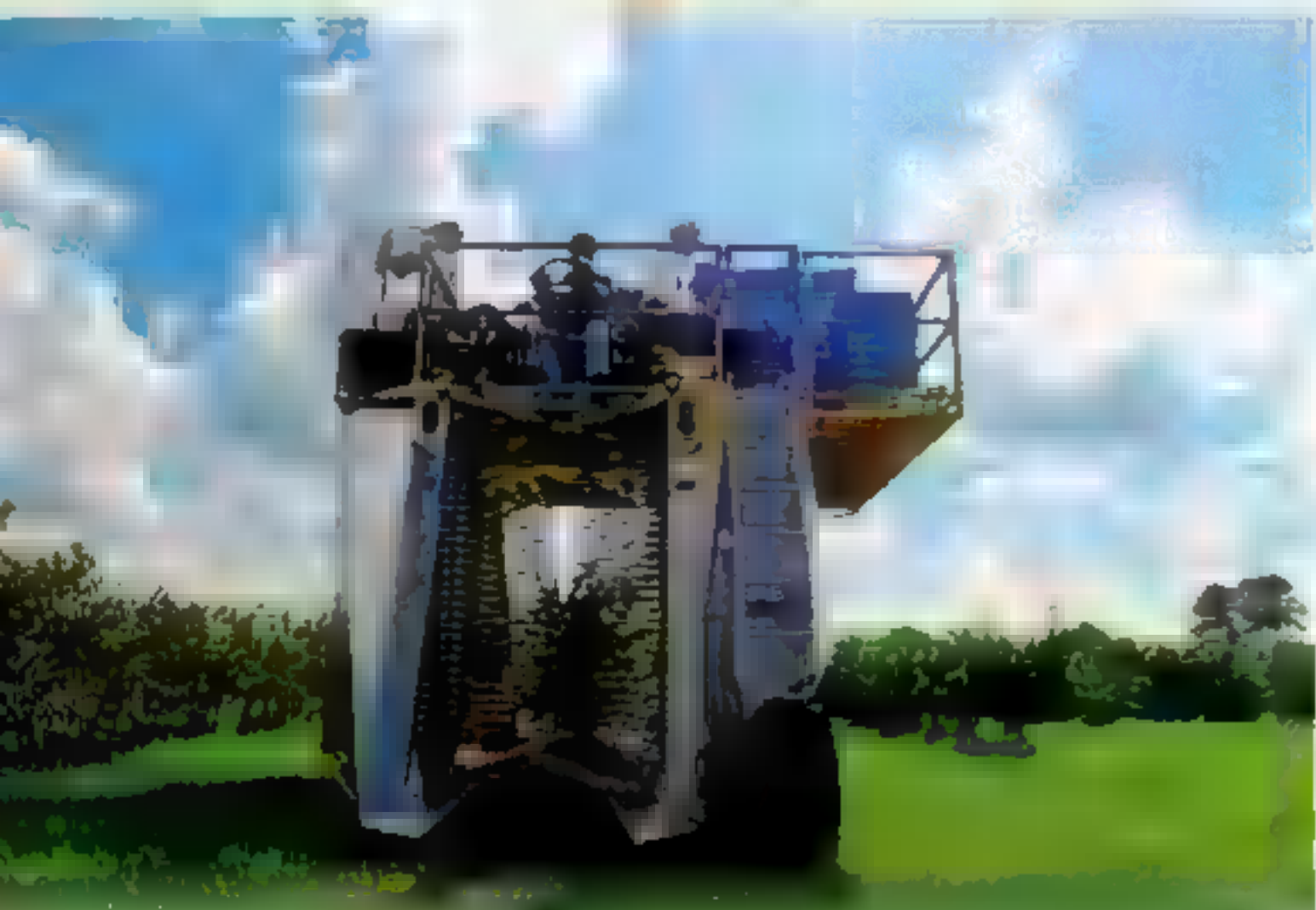
Herman Neff, a rawboned 80-year-old with a long white beard, stands in the middle of his 60 acres of blueberry

bushes, each laden with hundreds of plump, purple baubles. Over the low buzz of cicadas he explains the blueberry revolution sweeping this part of the state. His face lights up as he tells me how his neighbors thought he was crazy back in 1981 when he planted his first bushes, a special

variety bred to withstand the Mississippi heat. "They don't think I'm crazy now," he says, tilting back his broad-brimmed straw hat. Many local farmers have joined him, and currently more than 800 acres in Covington County are covered in blueberry bushes.

Blueberries, Neff says, are a perfect food, veritable bomb-lets of antioxidants, which may help ward off cancer, and

Herman Neff, a German Baptist farmer, and his grandsons Nathan and Jason Milyard (above, left to right) have no time for coffee. The boys drove in from Ohio to help Neff harvest his biggest blueberry crop in 23 years. Though Nathan had never driven a picker (left), "he got the hang of it pretty quick," says Neff. Timing is critical: A big rain at harvest-time could cause the berries to swell and split.



packed with other nutrients that some studies show will improve eyesight, reduce bad cholesterol, prevent urinary tract infections, and —ahem—keep one regular.

Neff never mentions pie, and before I can bring up the subject he's heading back to the chore at hand: harvesting his biggest crop in 23 years, more than 200 tons of blueberries. He and his two grandsons climb aboard a machine that resembles an automated car wash on wheels—a blueberry harvester. As they head down a row, the machine seems to swallow the eight-foot bushes, its fingerlike rods combing the branches, tickling ripe fruit into its belly.

I pop a handful of berries into my mouth, savoring their tangy juice in the midday heat. As the harvester chugs toward the horizon, Herman Neff is silhouetted against the blue sky. With his long beard and hat, he cuts the figure of a latter-day Ahab, cruising high above his sea of blueberries on a quest for a Moby Dick-size crop. While considering this thought, I recall that Ahab's first mate



Martha Diehl (above) serves members of the Stevens family, who drove an hour and a half to indulge in roast beef and corn bread salad, cinnamon pears and coconut macaroon pie—all served family style at Martha's Kitchen, an old-fashioned dining hall on the Diehls' farm. As Old Order German Baptists, Martha's parents,



was named Starbuck.

My own quest culminates near the end of Hot Coffee Road, where I at last find a satisfying cup at Martha's Kitchen, an old-fashioned dining hall used for family reunions and other events. It's run by the Diehl family, who as Old Order German Baptists shun most modern conveniences,

including electricity, telephones, and cars. "It's not that we believe these things are wrong," explains Martha, the daughter for whom the dining hall is named, "but they can create unnecessary temptations."

The Diehls don't seem to mind tempting me with food. Family matriarch Edith Diehl, dressed in a long skirt and a white bonnet despite the Mississippi heat, has laid in front of me a wedge of coconut macaroon

Bill and Edith (left), raised their five children to dress modestly and shun most modern amenities, including electricity and phones. The Diehls rely on propane stoves and ovens to cook food. For reservations, guests mail in requests—or stop by for a chat.



pie that melts on my tongue with such decadent sweetness that it surely must violate a dozen biblical tenets.

Edith's husband, Bill, who has a long white beard similar to Herman Neff's, refills my coffee and explains his secret for brewing the perfect cup. "You never pour boiling water over the grounds," he tells me. "I learned that in the egg business. Lots of coffee drinkers in the egg business."

You don't want to get Bill started on the various businesses he has embarked on—that is, unless you have a big piece of pie in front of you. During the 25 years since they moved here from rural Maryland, the Diehls' enterprises have included a butchery, a bakery, and a produce stand. Today they grow fruits and vegetables, make baskets, quilts, and furniture, and, when the weather's not too hot, cook for large groups at Martha's Kitchen.

As Bill pours me another cup, I ask him what brought the family to Hot Coffee. He says friends told them land was cheap and the people friendly: "It sounded like a good place." I raise the steaming coffee to my lips and inhale the aroma. Indeed, it is. □

Eager to venture beyond her family's farm, Martha Diehl worked as a seamstress, babysitter, and deli manager before scraping up \$5,000 to buy a former Tastee-Freeze on Mount Olive's Main Street (above). She converted it into a bus depot, selling tickets through the take-out window (below). "Every job I dreamed of I've done," she says, "except being a wife and mother."

Mt. Olive

Bus Depot

39119



THE PERFECT CUP Join our forum and share your secret for brewing great coffee, learn more about Old Order German Baptists, and see more images of zips 39428 and 39119 at nationalgeographic.com/magazine/0501.

Final Edit



DAVID ALAN HARVEY

ITALY BEFORE THE ROMANS

Last Impressions

A lot of back-and-forth goes on in the layout room over which photograph to use on a story's opening spread. Same goes for the last spread. "This picture has 'ender' written all over it," says illustrations editor Chris Scaptura. "Its selling point is the great quality of light."

The atmospheric photo was shot in Gubbio the night before the *Corsa dei Ceri*, a festival honoring the town's patron saint. "The problem was that we already had two Gubbio pictures in the layout," says Scaptura. The solution: end instead with a picture of sheep passing through a portal in the city wall of Falerii Novi. That photograph dovetails neatly with a passage toward the end of Erla Zwingle's text in which she walks the city's ruins.

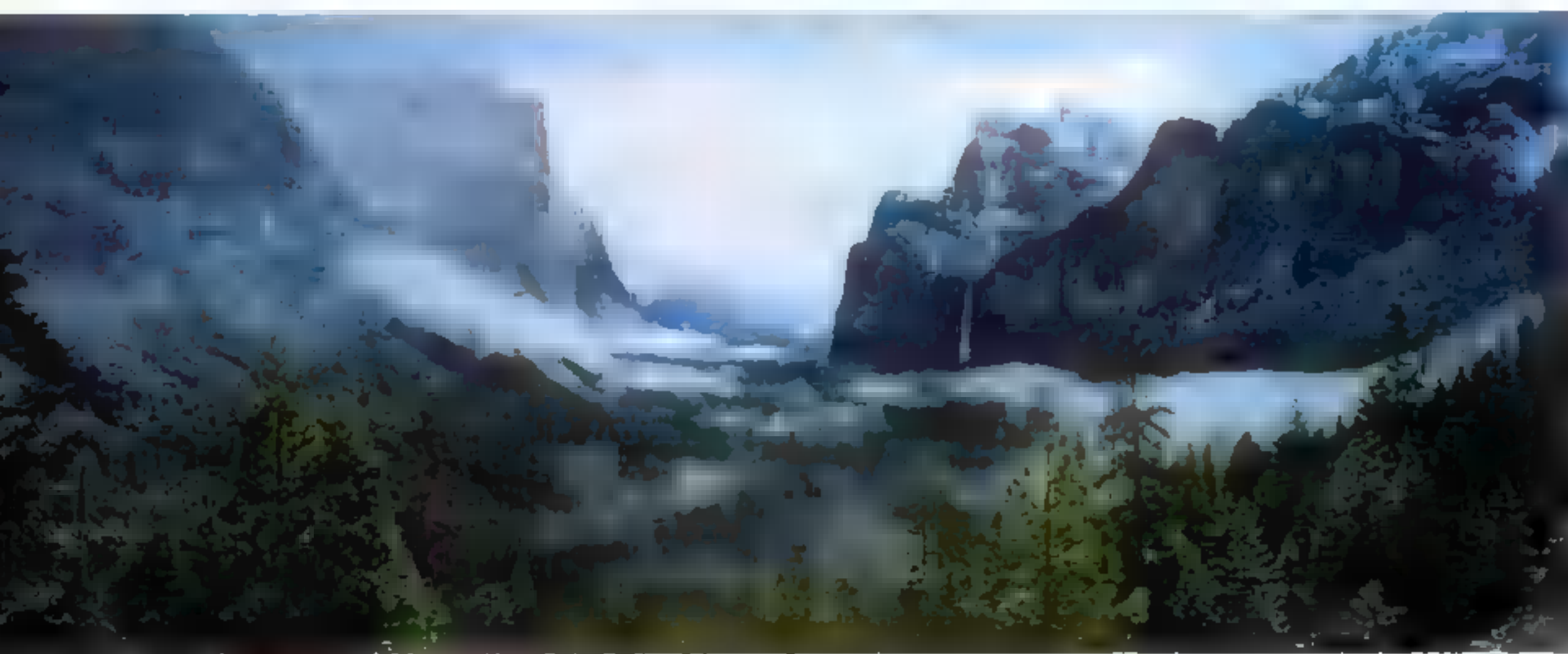
Still, Scaptura—a man proud of his Italian heritage—was torn. "This shot of people out on the street in Gubbio really gives you the feeling of what it's like to explore the streets of an Italian hill town."

WEBSITE EXCLUSIVE

Cut it or keep it? Find out more about what tipped the balance for this photograph at nationalgeographic.com/magazine/0501.

Do It Yourself

YOSEMITE NATIONAL PARK (SEE PAGE 98)



DICK DURRANCE II

GETTING THERE

Far From the Madding Crowd About 3.5 million people visit this U.S. national park each year, most cramming into the seven-mile-long Yosemite Valley (above). If you're planning a visit, here are some tips to avoid the crowds, help preserve the area's natural beauty, and get the most out of the park. To keep from contributing to traffic and pollution in the park, leave your car at a designated public lot in the valley or at Wawona and take the free shuttle buses that make a circuit through those areas. (As of 2005 the Park Service will be using hybrid diesel-electric buses, with 90 percent cleaner emissions.) Also, try focusing your trip on less congested areas, like the Hetch Hetchy Reservoir and Tuolumne Meadows; wilderness still prevails in most of Yosemite's 1,200 square miles, and some 800 miles of hiking trails weave through the park. The off-season is a great time to visit: Winter brings a snowy serenity, and in May waterfalls are in full roar. For road closings due to weather and other up-to-date park information, go to nps.gov/yose or call 209-372-0200.

TRY IT AT HOME

Virtual Vistas

Now you can enjoy a simulated experience of Yosemite's wilds by logging on to yosemite.org/vryos. Created by the Yosemite Association, a non-profit foundation dedicated to supporting the park, the website posts images of Yosemite Valley and Sentinel Dome, taken 24 hours a day by cameras mounted on



PHIL SCHERMEISTER

30-foot towers. The website also lets you pan across photographs similar to the one above, which shows the lone

Jeffrey pine that used to stand atop Sentinel Dome. To try your hand at panning, click on "panoramas."

PICKS

3 people

Yosemite's majesty inspired these three men, each of whom helped shape the destiny of the park:

■ **John Muir** A pioneering advocate for environmental preservation, Muir (below, at right) helped convince Congress to declare Yosemite a national park in 1890.



BETTMANN/CORBIS

■ **Teddy Roosevelt** During his tenure (1901 to 1909), the "conservation President" placed nearly 230 million acres of U.S. land under public protection. After a Yosemite camping trip with John Muir in 1903, T. R. (above, at left) supported legislation to enlarge the park.

■ **Ansel Adams** Also a passionate advocate for wilderness preservation, Adams made black-and-white portraits of Yosemite that launched a new era in photography.

TRAVEL TIPS

Find out more about the best ways to visit the park at nationalgeographic.com/magazine/0501.

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Flashback



NEW YORK TIMES

CAFFEINE

Great Expectations

A spinning tabletop and strategically placed spittoons helped the U.S. Board of Tea Experts demonstrate tea tasting to Mrs. Lyonel Robinson, a New York women's club president, in 1954.

The board set federal quality and taste standards during these sippings—and subsequent spitting outs—of imported teas. Examiner Robert H. Dick (to the right of Mrs. Robinson) was only the third person to head the board after its founding in 1897. He was also the last. Steeped in expertise, Mr. Dick stayed on until 1996, when Congress abolished the tea board. “Its demise was so completely unmourned,” noted a Food and Drug Administration official, that the agency received barely “a postcard” in protest.

—Margaret G. Zackowitz

WEBSITE EXCLUSIVE

You can access the Flashback photo archives and send electronic greeting cards at nationalgeographic.com/magazine/0501.

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Figure based on the top 20 companies in the Fortune 500 as compiled by Fortune magazine.



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